1. The Note of Rev. Bartlett to Several Sympathetic Friends
   Provided by Mass Historical Society, May 2010
2. Letter from Rev. Bartlett to his Son 1830

HISTORY OF MASSACHUSETTS GENERAL HOSPITAL

“MARBLEHEAD, Mass

Friday Eve, 29, 1830


My dear son:

“You ask me to state what I remember of my agency in the commencement of the Massachusetts Hospital and of the McLean Asylum. I believe that I have told that the first measures in the very earliest stage of that concern originated with me. From Nov. 3, 1807 to 1810 I was chaplain at the Almshouse in Boston. Dr. Jno. Gorham was the physician of the staff the first, and part of the second year of my residence, and Dr. Parker (son of the Bishop) the rest of the time. You know that I was ever interested in your profession, and having there a fine opportunity of indulging my taste, I pursued the study of it from the mere love of it. Much of my time was devoted to the sick, but the portion of the diseased which most interested me was the insane. There were generally from 10 to 20 in the house, and although the care was taken of them, which the circumstances of the house would afford, yet there was no proper place for their confinement and rest; a 20-foot building, with several cells opening into a long entry, in each of which cells was a board cabin or berth, with loose straw, a pail for necessary purposes, was their only accommodation. The violent were confined in strait jackets, and the filth and wretchedness of the place were dreadful. At that time there were no places of refuge for the insane in Massachusetts except in a few private houses in the country, owned and managed by Doctors, such as Willard’s, of Uxbridge, etc., etc. The mode of managing the insane then was most cruel, and unfavorable to recovery. Whipping, etc., was often resorted to (not at the Almshouse) but in these country places. The physicians at the Almshouse were humane, good men, but the subject of insanity they did not appear to understand; or rather, no facilities were afforded them for the employment of those moral remedies which Pinel and others had so successfully applied in France. This wretchedness of this class of patients and their miserable condition in the Almshouse moved my feelings exceedingly. I gave my mind intensely to the study of the causes and remedies of mania in its various kinds. I went to Philadelphia, N. York, examined the hospitals there, read Pinel and all the accounts I could procure of the Asylums in France, and England. I became deeply convinced of the importance of a similar Asylum in Massachusetts. What prompted me to action was, several persons of respectability seized suddenly deranged, and brought to the Almshouse, were put in these cells. Among others, a Capt. Jones seized suddenly on Change violently deranged. He was a stranger, commander of a vessel, and instantly put into a strait jacket, and locked up in one of these cells.

“I sat down to my desk and wrote from 15 to 25 billets addressed to some of the wealthiest and most respectable; gentlemen of Boston, requesting them to meet at Conant Hall on the Monday evening following, to take into consideration the importance of adopting some measures for the establishment of a Hospital for the Insane. Among these gentlemen were Sam Smith, Barney Smith, Francis D. Channing, Esq., Thomas Perkins, Col. Joseph May, Drs. J.C. Warren, James Jackson, Jno. Gorham, several others. They met agreeably to notice. Inquired who called them together and why. I gave a representation of the sad condition of the insane, the need of an Asylum, etc. They listened with interest and agreed that something should be done. They adjourned to the next Monday, when they met and formed themselves into a society for the purpose. At these meetings, I was Secretary. ’They adjourned for another week. When they met Doctors Warren, and Jackson, and Gorham suggested the Expediency of uniting with this object, the establishment of a Hospital for the sick. Some fears were expressed that by proposing too much, neither object could be obtained. Consequently, subscriptions were first solicited for the Insane Hospital. Lt. Gov. Phillips subscribed $20,000.

“At this third meeting, I observed to the gentlemen that as I was a young man and little known, it would be better that some other more known should be chosen Secretary. Accordingly they chose Mr. Codman (Richard, I think), son of Stephen Codman, Esq.

Yours in haste, J. BARTLETT.”

3. Circular Written by Drs. Warren and Jackson, August 1810

Warren Circular

Boston, August 20, 1810. Taken from Bodwitch N. History of the Massachusetts General Hospital. 1851. Printed by John Wilson and Son

Sir, - It has appeared very desirable to a number of respectable gentlemen, that a hospital for the reception of lunatics and other sick persons should be established in this town. By the appointment of a number of these gentlemen, we are directed to adopt such methods as shall appear best calculated to promote such an establishment. We therefore beg leave to submit for your consideration proposals for the
institutions of a hospital, and to state to you some of the reasons in favour of such an establishment.

It is unnecessary to urge the propriety and even obligation of succouring the poor in sickness. The wealthy inhabitants of the town of Boston have always evinced that they consider themselves as 11 treasurers of God's bounty; "and in Christian countries, in countries where Christianity is practised, it must always be considered the first of duties to visit and to heal the sick. When in distress, every man becomes our neighbour, not only if he be of the household of faith, but even though his misfortunes have been induced by transgressing the rules both of reason and religion. It is unnecessary to urge the truth and importance of these sentiments to those who are already in the habit of cherishing them, to those who indulge in the true luxury of wealth, the pleasures of charity. The questions which first suggest themselves on this subject are, whether the relief afforded by hospitals is better than can be given in any other way; and whether there are, in fact, so many poor among us as to require an establishment of this sort.

The relief to be afforded to the poor, in a country so rich as ours, should perhaps be measured only by their necessities. we have, then, to inquire into the situation of the poor in sickness, and to learn what are their wants. In this inquiry, we shall be led to answer both the questions above stated.

There are some who are able to acquire a competence in health, and to provide so far against any ordinary sickness as that they shall not then be deprived of a comfortable habitation, nor of food for themselves and their families; while they are not able to defray the expenses of medicine and medical assistance. Persons of this description never suffer among us. The Dispensary gives relief to hundreds every year; and the individuals who practise medicine gratuitously attend many more of this description. But there are many others among the poor, who have, if we may so express it, the form of the necessaries of life, without the substance. A man may have a lodging; but it is deficient in all those advantages which are requisite to the sick. It is a garret or a cellar, without light and due ventilation, or open to the storms of an inclement winter.

In this miserable habitation, he may obtain liberty to remain during an illness; but, if honest, he is harassed with the idea of his accumulating rent, which must be paid out of his future labours. In this wretched situation, the sick man is destitute of all those common conveniences, without which most of us would consider it impossible to live, even in health. 'Wholesome food and sufficient fuel are wanting; and his own sufferings are aggravated by the cries of hungry children. ?above all, he suffers from the want of that first requisite in sickness, a kind and skilful nurse.

But it may be said, that instances are rare among us, where a man, who labours, with even moderate industry, when in health, endures such privations in sickness as are here described. They are not, however, rare among those who are not industrious; and who, nevertheless, when labouring under sickness, must be considered as having claims to assistance. In cases of long-protracted disease, instances of such a description do occur amongst those of the most industrious class. Such instances are still less rare among those women who are either widowed, or worse than widowed. It happens too frequently that modest and worthy women are united to men who are profligate and intemperate, by whom they are left to endure disease and poverty under the most aggravated forms. Among the children of such families also, instances are not rare of real suffering in sickness. To all such as have been described, a hospital would supply every thing which is needful, if not all they could wish. In a well-regulated hospital, they would find a comfortable lodging in a duly attempered atmosphere; would receive the food best suited to their various conditions; and would be attended by kind and discreet nurses, under the directions of a physician. In such a situation, the poor man's chance for relief would be equal perhaps to that of the most affluent, when affected by the same disease.

There are other persons, also, who are of great importance in society, to whom the relief afforded by a hospital is exceedingly appropriate. Such are generally those of good and industrious habits, who are affected with sickness, just as they are entering into active life, and who have not had time to provide for this calamity. Cases of this sort are frequently occurring. Disease is often produced by the very anxiety and exertions which belong to this period of life; and the best are the most liable to suffer. Of such a description, cases are often seen among journeymen mechanics and among servants.

Journeymen mechanics commonly live in small boarding-houses, where they have accommodations which are sufficient, but nothing more than sufficient, in health. When sick, they are necessarily placed in small, confined apartments, or in rooms crowded with their fellow-workmen. They are sheltered from the weather, and have food of some sort; and these must, in many cases, be the extent of their accommodations. Persons of this description would do well to enter a hospital, even if they had to pay the expense of their own maintenance. In most cases, they would suffer less, and recover sooner, by so doing. When, as sometimes happens, they have knot the means of payment, they become objects of charity; and the welfare to such persons should be considered among the strong motives in favour of "establishing" a hospital. Servants generally undergo great inconveniences, at least when affected with sickness, and oftentimes much more than inconveniences. With so much difficulty is the care of them attended in private families, that many gentlemen would pay the board of their servants at a hospital, in preference to having them sick in their own houses. In some cases, however, neither the master nor servant can afford the expense of proper care in sickness. Not uncommonly, a young girl is taken sick in a large family, where she is the only servant.
She lodges in the most remote corner of the house, in a room without a fireplace. The mistress is sufficiently occupied with the unusual labours which are thrown on her at a time perhaps when she is least fitted to perform them. Under such circumstances, how can the servant receive those attentions which are due to the sick? Of what use is it that the physician leaves a prescription to be put up at the Dispensary? He goes the next day, and finds that there, has not been time even to procure the remedies which he had ordered; meanwhile, the period in which they would have been useful has passed by, and the incipient disease of yesterday has now become confirmed.

Persons of these descriptions would not be disposed to resort to a hospital on every trivial occasion. But, when afflicted with serious indisposition, they would find in such an institution an alleviation of their sufferings, which it must gladden the heart of the most frigid to contemplate.

There is one class of sufferers who peculiarly claim all that benevolence can bestow, and for whom a hospital is most especially required. The virtuous and industrious are liable to become objects of public charity, in consequence of diseases of the mind. When those who are unfortunate in this respect are left without proper care, a calamity, which might have been transient, is prolonged through life. The number of such persons, who are rendered unable to provide for themselves, is probably greater than the public imagine; and, of these, a large proportion claim the assistance of the affluent. The expense which is attached to the care of the insane in private families is extremely great, and such as to ruin a whole family that is possessed of a competence under ordinary circumstances, when called upon to support one of its members in this situation. Even those who can pay the necessary expenses would perhaps find an institution, such as is proposed, the best situation in which they could place their unfortunate friends. It is worthy of the opulent men of this town, and consistent with their general character, to provide an asylum for the insane from every part of the Commonwealth. But if funds are raised for the purpose proposed, it is probable that the Legislature will grant some Assistance, with a view to such an extension of its benefits.

Of another class, whose necessities would be removed by the establishment of a hospital, are women who are unable to provide for their own welfare and safety in one of nature’s most trying hours. Houses for lying women have been found extremely useful in the large cities of Europe; and although abuses may have arisen in consequence, these are such as are more easily prevented in a small than in a large town.

There are many others who would find great relief in a hospital, and many times have life preserved when otherwise it would be lost. Such especially are the subjects of accidental wounds and fractures among the poorer classes of our citizens; and the subjects of extraordinary diseases, in any part of the Commonwealth, who may require the long and careful attention of either the physician or surgeon.

It is possible that we may be asked whether the almshouse does not answer the purposes for which a hospital is proposed. That it does not, is very certain. The town is so much indebted to the liberality of those gentlemen who, without compensation, superintend the care of the poor, that we ought not to make this reply without an explanation. The truth is that the Almshouse could not serve the purpose of a hospital, without such an entire change in the arrangements of it as the overseers do not feel themselves authorized to make, and such as the town could not be easily induced to direct or to support.

The Almshouse receives all those who do not take care of themselves, and who are destitute of property, whether they be old and infirm, and unable to provide means of assistance; or are too vicious and debauched to employ themselves in honest labour, or are prevented from so employing themselves by occasional sickness. This institution, then, is made to comprehend what is more properly meant by an Almshouse, a bridewell or house of correction, and a hospital. Now, the economy and mode of government cannot possibly be adapted at once to all these various purposes. It must necessarily happen that in many instances the worst members of the community, the debauched and profligate, obtain admission into this house. Hence it has become, in some measure, disreputable to live in it; and, not frequently, those who are the most deserving objects of charity cannot be induced to enter it. To some of them, death appears less terrible than a residence in the Almshouse.

It is true that the sick in that house are allowed some greater privileges and advantages than are extended to those in health; yet the general arrangements and regulations are necessarily, so different from those required in a hospital, that the sick - far from having the advantages afforded by the medical art - have not the fair chance for recovery which nature alone would give them. Most especially they suffer for the want of good nurses. In these officers must be placed trust and confidence of the highest nature. Their duties are laborious and painful. In the almshouse, they are selected from among the more healthy inhabitants; but, unfortunately, those who are best qualified will always prefer more profitable and less laborious occupations elsewhere. It must, then, be obvious that the persons employed as nurses cannot be such as will conscientiously perform the duties of this office.

In addition to what has already been stated, there are a number of collateral advantages that would attend the establishment of a hospital in this place. These are the facilities for acquiring knowledge, which it would give to the students in the medical school established in this town. The means of medical education in New England are at present very limited, and totally inadequate to so important a purpose.
We are, sir, very respectfully, your obedient servants,

ourselves that in this respect, as in all others, Boston may ere States have institutions of this sort, which do great honor to cities of the Old World; and our large cities in the Middle Groaning under their weight? Sure of accumulating riches in those stores which are already establish a school; every one may derive, directly or indirectly, of the munificence of the present times, which will ensure to its founders the blessings of thousands in ages to come; that it is to erect a most honourable monument may require assistance during the present year or present age, but that it is to afford relief, not only to those who consider that it is to afford relief, not only to those who may require assistance during the present year or present age, but that it is to erect a most honourable monument of the munificence of the present times, which will ensure to its founders the blessings of thousands in ages to come; and when we add that this amount may be raised at once, if a few opulent men will contribute only their superfluous income for one year. Compared with the benefits which such an establishment would afford, of what value is the plea- sure of accumulating riches in those stores which are already groaning under their weight?

Hospitals and infirmaries are found in all the Christian cities of the Old World; and our large cities in the Middle States have institutions of this sort, which do great honor to the liberality and benevolence of their founders. We flatter ourselves that in this respect, as in all others, Boston may ere long assert her claim to equal praise.

We are, sir, very respectfully, your obedient servants,

James Jackson John C. Warren

4. Charter Authorizing the Massachusetts General Hospital

In the public Domain

An Act to incorporate certain persons by the name of the Massachusetts General Hospital.

Section 1. Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, That James Bowdoin, John Adams, Elbridge Gerry, Theophilus Parsons, William Gray, John Thornton Kirkland, Harrison Gray Otis, Christopher Gore, William Eustis, William, Phillips, John Quincy Adams, Henry Dearborn, Levi Lincoln, Isaac Parker, Joseph B. Varnum, George Cabot, Perez Morton, Thomas Dawes, Thomas Hazard, jun., Thomas Cutts, Israel Thornhicle, Mathew Bridge, Samuel Brown, James Perkins, David Tilden, John Lowell, Samuel Dana, Joseph Story, William King, Samuel Fowler, Marshall Spring, Thomas H. Perkins, Thomas C. Amory, Benjamin Bussey, Aaron Hill, William Heath, Thomas Kittredge, James Prince, Benjamin Green, Thomas Melville, Joseph Coolidge, Elias H. Derby, John C. Jones, Jonathan Davis, Jonathan Harris, James Mann, Timothy Childs, Daniel Kilham, Benjamin Crowninshield, Arnold Wells, Jonathan Amory, Robert Hallowell, Andrew Craigie, John Warren, Richard Sullivan, and William Payne, together with such other persons, as may hereafter be admitted members of the Corporation hereinafter created, according to the Bye Laws thereof be, and they hereby are incorporated and made a Body Corporate and Politic, by the name of The Massachusetts General Hospital, and by that name may sue and be sued, and shall have and use a Common Seal, to be by them devised, altered, and renewed at their pleasure.

Section 2. And be it further enacted. That the said Corporation may take and receive, hold, purchase, and possess, of and from all persons disposed to aid the benevolent purposes of this institution, any grants and devises of lands and tenements, in fee simple, or otherwise, and any donations, and bequests, and subscriptions of money, or other property, to be used and improved for the erection, support, and maintenance of a General Hospital, for sick and insane persons, [which, among its functions may carry on educational Activities and scientific research related to the care of such persons or to the promotion of health and the prevention of disease.] Provided that the income of said Corporation shall be held and obliged to appropriate out of its funds, annually forever, to the support and maintenance of such sick poor, and lunatic persons, as may be received into said Hospital at the request of the legislature, or of any
committee or officer appointed as the legislature may hereafter provide for the purpose, a sum equal to simple interest on the money, for which the Province-House estate shall be sold; and until the sale thereof, the said Corporation shall be held to keep a correct account of the rents received, to be applied to the maintenance of sick poor, and lunatic persons, who would otherwise be chargeable to the Commonwealth, as soon as the Hospital shall be erected. And in case the said estate shall revert to the Commonwealth, as by the former amount of said rents shall be paid into the Treasury of the Commonwealth.

Section 4. And be it further enacted. That in consideration of the obligation aforesaid imposed upon said Corporation in the foregoing section, the estate commonly called the Old Province House, with all the lands under and appurtenant to the same, be, and are hereby given and granted unto said Corporation in fee simple, to be sold at the discretion of said Corporation, and the proceeds thereof to be held and applied as a foundation for a General Hospital.

Section 5. Be it further enacted. That the said General Hospital, shall be under the direction and management of Twelve Trustees, who shall be chosen annually, and shall remain in office until others are chosen, and qualified in their stead. [eight of which Trustees shall be chosen aforesaid.]

[(In case of the occurring of any vacancy, by death or resignation in the Board of the Trustees of the Massachusetts General Hospital, it shall be lawful, for the remaining Members of the Board, to fill such vacancy; provided, the same shall occur in that part of the Board, chosen by the Corporation. The Governor with the advice and consent of the council, shall annually, as soon as may be after the first Wednesday in February, appoint four trustees of the Massachusetts General Hospital, who shall hold their offices for one year, or until the appointment of their successors; and in case of the occurring of any vacancy by death or resignation among the trustees so appointed, the governor may, with the advise and consent of the council, fill such vacancy].

Section 6. And be it further enacted. That the said Corporation may, at their first, or any subsequent meeting, choose all necessary and convenient officers, who shall have such powers and authorities as the said, Corporation may think proper to prescribe and grant to them, and who shall be elected in such manner, and for such periods of time, as the Bye Laws of said Corporation may provide. And said Corporation may further make and establish such Bye Laws and regulations, for the internal Government and economy of the Hospital, as they may think proper, not repugnant to the Constitution and Laws of this Commonwealth.

Section 7. And be it further enacted. That the Governor, Lieutenant Governor; the President of the Senate and Speaker of the House of Representatives, with the Chaplains of both Houses for the time being be, and hereby are made and constituted a Board of Visitors of the said Hospital; with authority to visit the same semi-annually, and as much oftener as they may think proper, in order to inspect the establishment, and the Actual condition of the sick, to examine the Bye Laws and regulations,—enacted by said Corporation, and generally, to see that the design of the institution be carried into effect, in a careful, tender and effectual manner; and especially to see that the State has its full proportion of patients in the Hospital, as provided in the third section of this Act, and that the said patients are suitably attended to, and comfortably maintained.

Section 8. And be it further enacted, by the authority aforesaid. That in case of the separation of the District of Maine, and the erection of it into a separate State, pursuant to the provisions of the Constitution of the United States, the amount of the sale of the Province House shall be carried into the estimate, with the other public property of the Commonwealth.

Section 9. And be it further enacted. That it shall be lawful for the said Corporation, at any general meeting of the members thereof, to alter or change the name of said Corporation, either by substituting the name of any distinguished Benefactor, who may contribute a sum exceeding the amount given by the Commonwealth, or by adding the name of such Benefactor, to the name given to said Corporation by this Act, in case the sum so given by such Benefactor, shall not exceed the sum given by this Commonwealth. And upon such change so as aforesaid made, the said Corporation shall have a right to assume and take such name, and shall have hold and enjoy all the powers and privileges given by this Act, notwithstanding such alteration and change.

Section 10. And be it further enacted. That James Bowdoin, Esquire be, and hereby is authorized to call the first meeting of said Corporation, by notification, and therein to appoint the time and place, of said meeting: Provided, that no notification shall be deemed valid unless it be published in all the Newspapers printed in Boston for six weeks in succession.

[(Section 11.) Be it (further) enacted. That the Massachusetts General Hospital be, and the said corporation hereby is authorized to grant annuities on the life or lives of one or more persons, or for shorter terms of time, on such conditions, and with such security, as the said corporation and the annuitant or annuitants, may agree upon.]

[(Section 12.) Be it further enacted. That if at any time hereafter it shall appear to the Legislature, that the privilege of granting annuities, hereby given to the said corporation, shall be injurious to the public welfare the power of the Legislature to repeal this Act, authorizing such annuities, shall not be denied or impaired; but such repeal shall not effect any engagement to which said corporation may have become a party previous thereto. And it shall be the duty of]
the Trustees of the said Massachusetts General Hospital to
transmit to the Governor and Council of this Commonwealth
for the time being, annually, on the first Monday in January
of each year, an accurate account of all annuities by them sold
or granted, by virtue of this Act, signed by the said trustees
or a major part of them, and attested by the Treasurer of the,
corporation.]

[(Section 13.) The Household Nursing Association, a char-
itable corporation incorporated under Chapter one hundred
and twenty-five of the Revised Laws, is hereby authorized,
by acceptance of this Act within one year after its effective
date at a meeting of the members duly called for the purpose,
to consolidate with The Massachusetts General Hospital, a
charitable corporation organized and existing under Chapter
ninety-four of the Acts of eighteen hundred and ten, and upon
such consolidation The Massachusetts General Hospital shall
in all respects be a continuation of, shall have all the pow-
er, privileges and exemptions of, and shall be subject to all
duties, liabilities and restrictions provided by law in so far
as they relate to both said corporations. Upon such accept-
cance, and upon acceptance Of this Act within one year
after its effective date at a meeting of the members of The
Massachusetts General Hospital duly called for, the purpose,
copies of the votes of acceptance certified by the clerk or
other officer of the respective corporations shall be filed in
the Registry of Deeds for Suffolk County and with the state
secretary, and the consolidation of The Household Nursing
Association with The Massachusetts General Hospital shall
thereupon be complete.]

[Section 14.) Upon consolidation, all property, real and per-
sonal, of The Household Nursing Association and all devises,
bequests, conveyances and gifts heretofore and hereafter
made to such corporation shall vest in The Massachusetts
General Hospital and otherwise shall be held by its subject to
the same terms, conditions, limitations and trusts as they are
now held by The Household Nursing Association or would
have been held but for this Act, and the treasurers of such
 corporations are hereby respectively authorized to execute,
acknowledge and deliver all papers and documents that may
be deemed necessary or proper for the purpose of confirming
in The Massachusetts General Hospital the record title of the
property of The Household Nursing Association.]

[(Section 15.) Whatever right or authority is granted or con-
ferred by this Act is hereby declared to be limited to such
authority or right as the general court may constitutionally
grant or confer, without prejudice to any proceeding that may
be instituted in any court of competent jurisdiction to effect
the purposes of this Act.

[Section 16. And be it further enacted, that the
Massachusetts General Hospital may, in the course of
its educational Activities, award the degrees of Bachelor
of Science in Radiologic Technology, Bachelor of Science
in Respiratory Therapy, Master of Science in Dietetics, of
Science in Nursing, Master of Science Master in Physical
Therapy, and Master of Science in Speech Pathology.]

5. Excerpts of the Translation of W. Roentgen’s Paper

Read before the Würzburg Physical and Medical Society,

“A discharge from a large induction coil is passed
through a Hittorf’s vacuum tube, or through a well-exhausted
Crookes’ or Lenard’s tube. The tube is surrounded by a fairly
close-fitting shield of black paper; it is then possible to see,
in a completely darkened room, that paper covered on one
side with barium platinocyanide lights up with brilliant flu-
orescence when brought into the neighborhood of the tube,
whether the painted side or the other be turned towards the
tube. The fluorescence is still visible at two metres distance.
It is easy to show that the origin of the fluorescence lies
within the vacuum tube.

“Lead 1.5 mm thick is practically opaque.”

“The preceding experiments lead to the conclusion that the
density of the bodies is the property whose variation mainly
affects their permeability.”

“density alone does not determine the transparency”

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<thead>
<tr>
<th>Thickness</th>
<th>Relative thickness</th>
<th>Density</th>
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<tr>
<td>Platinum</td>
<td>0.018 mm</td>
<td>1</td>
</tr>
<tr>
<td>Lead</td>
<td>0.050&quot;</td>
<td>3</td>
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<tr>
<td>Zinc</td>
<td>0.100&quot;</td>
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<tr>
<td>Aluminium</td>
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<td>200</td>
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“The fluorescence of barium platinocyanide is not the only
noticeable action of the X-rays. It is to be observed that other
bodies exhibit fluorescence, e.g. calcium sulphide, uranium
glass, Iceland spar, rock-salt, &c.”

(2) It is seen, therefore, that some agent is capable of pen-
etrating black cardboard which is quite opaque to ultra-violet
light, sunlight, or arc-light. It is therefore of interest to inves-
tigate how far other bodies can be penetrated by the same
agent. It is readily shown that all bodies possess this same
transparency, but in very varying degrees. For example, paper
is very transparent; the fluorescent screen will light up when
placed behind a book of a thousand pages; printer’s ink offers
no marked resistance.” “If the hand be held before the flu-
orescent screen, the shadow shows the bones clearly with only
faint outlines of the surrounding tissues.”

“Pieces of platinum, lead, zinc, and aluminium foil were so
arranged as to produce the same weakening of the effect. The
annexed table shows the relative thickness and density of the
equivalent sheets of metal.
From these values it is clear that in no case can we obtain
the transparency of a body from the product of its density
and thickness. The transparency increases much more rapidly
than the product decreases”.

“Of special interest in this connection is the fact that pho-
tographic dry plates are sensitive to the X-rays. It is thus
possible to exhibit the phenomena so as to exclude the danger
of error”

“It is, hence, obvious that lenses cannot be looked upon
as capable of concentrating the X-rays; in effect, both an
ebonite and a glass lens of large size prove to be without
action.”

“I have also a shadow of the bones of the hand”

“It is, hence, obvious that lenses cannot be looked upon
as capable of concentrating the X-rays; in effect, both an
ebonite and a glass lens of large size prove to be without
action.”

“I have also a shadow of the bones of the hand”
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