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DEPARTMENT OF SURVEYS.

ANNUAL REPORT

OF THE

CHIEF ENGINEER AND SURVEYOR

OF THE

CITY OF PHILADELPHIA.

R-2

Submitted to the Mayor January 18th, 1870.

PHILADELPHIA:

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1870.

ANNUAL REPORT.

DEPARTMENT OF SURVEYS,
PHILADELPHIA, *January 18, 1870.*

To the HON. DANIEL M. FOX,
Mayor of Philadelphia.

SIR:—In compliance with your circular of the 17th of December, I herewith submit a statement of the general condition and business of this department for the year 1869; together with an account of all moneys received and disbursed: Amount of annual appropriation to depart-

ment, as per Ordinance Dec. 30th, 1868,	-	\$34,937 00
Special appropriation, per Ord. Oct. 9, 1868,		1,600 00
Total appropriations,	- -	<u>\$36,537 00</u>

The expenditures have been as follows:

Expenses, General Office,		
Registry Bureau and District Surveyors,	-	\$15,204 00
Plans for Fairmount bridge superstructure,	-	1,625 00
New surveys, revisions and landmarks,	-	18,231 24
Balance returned to Treasury,	- - -	1,476 76
		<u>\$36,537 00</u>

The receipts, as deposited with the City Treasurer, have been as follows:

From sewer permits and office charges,	- -	3,589 70
“ Registry Bureau examinations,	- -	150 48
Total receipts,	- - -	<u>\$3,740 18</u>

The above includes the payments during the year 1869, by the City Passenger Railway Companies, for extra cost to the City of building sewers consequent upon the location of roads and keeping the same in operation while the sewer alongside is being constructed.

These charges for the years 1867 and 1868, amounted in the aggregate to \$4,576 24, of which but \$2,044 38 has been

paid, leaving the following companies indebted to the City, as noted below, viz. :

Second & Third streets, - - - - -	\$65 50
Chestnut & Walnut streets, - - - - -	342 90
Race & Vine streets, - - - - -	33 00
Seventeenth & Nineteenth streets, - - - - -	136 20
Girard College, - - - - -	86 50
Union, - - - - -	418 50
Thirteenth & Fifteenth streets, - - - - -	125 50
Spruce & Pine streets, - - - - -	5 50
Green & Coates streets, 1867, \$314 66 } - -	564 96
“ “ “ 1868, 250 30 } - -	
Fourth & Eighth streets, 1867, \$97 00 } - -	241 90
“ “ “ 1868, 144 90 } - -	
Arch street, - - - - -	234 30
Ridge avenue, - - - - -	123 80
Schulkill river, - - - - -	153 30
	\$2,531 86

The extension of our City plans for the past year, so far as relates to new surveys, has been confined to the First, Twenty-second and Twenty-third Wards, covering an area of 2,739 acres, while much time has been consumed in the adjustment of revisions, made necessary by the erection of improvements, changing the character of the several localities.

The following is a list of plans filed :—

No.	Title.	Approved by Board.
16½.	Lines of a street connecting W. Walnut lane & Wissahickon av.	
16¼.	Revision of grades on Green street.	
71.	Re-survey of part of Fourth Ward.	Sep. 20th, 1869.
87.	Revision wharf lines on Schuylkill river, from Fairmount Park to South street,	Feb. 1st, “
121.	Revision of grades on Thompson bet. 26th & 31st sts.,	Dec. 20th, “
147.	Revision of lines & grades of 5th section of 23d Ward.	
165.	Revision of Evergreen avenue,	Oct. 18th, “
179.	Revision of Fifth section of First Ward,	
228.	Survey and Regulation 14th section 21st Ward,	Feb. 1st, “
220.	“ “ 18th “ “	Mar. 1st, “
231.	“ “ 12th “ “	Mar. 1st, “
232.	“ “ 9th “ 22d Ward.	
233.	“ “ 10th “ “	
234.	Extension of lines of Broad street,	Nov. 15th, “
235.	Survey and Regulation 6th section of 1st Ward.	
236.	“ “ 7th “ “	
237.	“ “ 8th “ “	
338.	Re-survey of Second and Third Wards.	
049.	Survey and Regulation 11th section 22d Ward.	
222.	Lines of Paoli street, 21st Ward.	

All plans of survey, whether of new area or revisions of old work, receive the careful examination of the Board of Surveyors, both on the ground and on plan, and also their official approval, before being submitted to the Court for final confirmation.

Much of the time of the Board of Surveys in session is occupied in the examination of petitions, asking for the extension of branch sewers, 131 of which have been acted upon during the past year, 128 of which have been constructed. Of these, 72 have been entirely at private expense, 43 under authority granted by the Board of Surveyors, based upon the signatures of a majority of the persons owning property fronting upon them, and 13 under authority of Councils expressed by ordinance; the latter being necessary whenever a majority of owners will not sign favorably, and the exigencies of the locality demand it.

The total length of branch sewers constructed during 1869 is 49,598 feet, or $9\frac{4}{10}$ miles nearly, the cost of which amounts to \$136,317 57. Of this, \$19,869 96 has been paid by the City, and \$116,447 61 by the owners of property fronting on the sewers.

In many cases where the sewer is solely for the advantage of persons residing upon its line, whether in the management of the particular business in which they may be engaged, or for the drainage of their premises, without in any way benefiting the surface drainage, it has been customary to withhold any payments on the part of the City for its construction. This has caused an expenditure by property owners, over and above their assessed rates, of \$2,126 22. Of the assessment bills prepared, \$683 77 have been sent to the Department of Highways for collection, for the benefit of the City; thus reducing the sewer expense to the City for the year, by that amount collected.

In 1868, the length of branch sewers laid reached 32,664 feet, or $6\frac{1}{4}$ miles nearly, costing \$75,963 77, divided between the City and individuals, as follows:—

City expenditure, - - - - -	\$13,394 56
Individual expenditure, - - - - -	62,569 21
	<hr/>
	\$75,963 77

It is much to be regretted that, notwithstanding those con-

structing branch sewers at their own expense protect themselves from imposition (in having their sewers used by persons not contributing to their construction), by having their cost recorded in this department, yet such protection seems to be entirely inadequate; and our records, therefore, so far as regards sewers constructed at private expense, are exceedingly imperfect, forcing the conviction that no work of that character should be executed under private arrangements, except after being duly advertised and allotted by the Highway Department.

Parties desiring privilege to construct sewers for their own use, at their own expense, now receive privilege to do so from the Board of Surveyors, with an understanding that they have the work done under the superintendence of the District Surveyors, as directed by Ordinance May 12th, 1866. But this section of the law is practically a dead letter. The grant being received, no further attention is given to the provisions of that grant, and the District Surveyor is never advised either of its beginning, progress or completion; and our records, therefore, give no history of it, except that the privilege to construct was granted. An ordinance prohibiting the construction of any sewers in the public streets, excepting under a contract with the City, will correct this.

As regards private connections with sewers, of which so much has been written, in the endeavor to show the serious injury our sewers sustain by having inexperienced or careless persons tampering with them, I would say that, owing to the Supplement of July 15th, 1867 (as stated in my report of January, 1868), the Ordinance "To Promote Cleanliness and Health," so carefully drawn and long considered, both in Committee and Chambers, has become entirely ineffective. This department issues permits, but knows nothing of the mode of their construction. And we feel assured that a large number are made without even the form of an application for permit; while in many cases, the permit granted is not conformed to, either as to the character or amount of drainage applied for.

I feel assured that, was the location of every private sewer connection known and recorded in this department, as they should be, the annual return for sewer rental would be largely increased, and we would find a large proportion of them had been constructed without any authority whatever.

Was the original Ordinance of March 9, 1867, "To Promote Cleanliness and Health" in force, we should have a guard against this in the person of the licensed inspector, as would be *his interest* to watch such violations of the law, and the City thus be benefited both in revenue and in item of repairs to sewers. I earnestly plead for the repeal of the Supplement of July 15, 1867. It would save much in sewers repairs, if pipes for house connections were built in the sewers as they are constructed, and a small charge, covering the cost, placed upon the bills of assessment; this would prevent the sewers being broken into after completion, to their serious injury. Experience has drawn us to this practically, as is shown by our return of permits for the years 1868 and 1869, where, for the former year, with only 784 permits, our returns were \$3,090, while, for the latter, with 848 permits, we return but \$2,950. This results from the fact that as new sewers are being constructed, persons residing upon their lines arrange with the contractor to make their connections; and as the street-paving is already disturbed, and they pay their sewer assessment bills to the contractor, the usual permit is obtained without other charge to the City than the yearly rental.

During the year there has been constructed 179 public inlets to sewers, each of which, when properly built, and attended when built tends to the increased healthfulness of the City by reducing the length of surface-flow in gutters, and the accumulation of garbage, with the deleterious effect its decomposition has upon our breathing atmosphere. Our efforts to do away with objectionable gutters crossing the footways have been only partially successful; whenever a complaint of such a gutter is presented, an examination is at once made, and a report submitted to the Committee on Surveys and Regulations; upon their approval, notices are at once sent to the properties from which the objectionable drainage is discharged, as by law directed. This done, we have no means of knowing whether our notices have been regarded or not, as there is no officer of this department whose services could be spared for such duty.

Whenever those particularly interested have advised us that the notices of the department have had no effect, the case is promptly referred to the City Solicitor, by whom suit is

instituted, a fine imposed, and the source of complaint removed.

Again, by Ordinance of March 9, 1867, Sect. 8, it is made the duty of all persons, either erecting new houses or altering old ones upon the line of any sewer, to provide underground drainage from such premises by connections with the sewer; yet, important as this law is, it is entirely disregarded, from the fact that there is no one whose duty it is to examine for and report upon such facts. Other cases of violation of law in which this department is deeply interested, but is powerless to correct, may be laid before you, such as the very many encroachments upon our footways by railings that are "not around excavated areas," and yet extend beyond the house line so as to reduce the width of footway below that specified in ordinance, and the numerous door-steps that extend into the public street beyond the prescribed limit of law; but, as before, there is no officer in this department whose time could be spared to make the required investigation.

The work of constructing the main sewers ordered by Ordinance, April 24, 1868, has progressed satisfactorily.

The following exhibits those that have been finished, with the cost:—

Location of Sewers.	Diameter.	Length.	Total Length.	Cost to City.	Cost to Property Owners.	Total Cost.	Lengths of different sized Sewers.	
							Sewers.	Feet.
Brown street, Franklin to Parrish } Eleventh street, Christian to Wash- ington avenue.....	5.0 feet 4.5 "	696 feet 1,207 "	1,903 feet	\$25,662 20	\$1,620 48	\$27,182 82	2 feet	12,755
Eighteenth street, Vine to Spring Garden.....	3.0 " 3.0 "	853 " 1,670 "	853 " 1,670 "	2,049 85 8,234 58	766 75 2,528 72	2,816 60 5,768 80	3½ "	525 634
Gunners' Run, Broad St., Clearfield to Twenty-second and Tioga.....	8½ ft. 6 ft. 7½ ft. 6½ ft. 7 ft. 4½ ft. 3½ ft.	671 ft 887 ft 1,110 ft 684 ft 919 ft 825 ft 628 ft 530 ft 433 ft	6,237 "	54,491 18	14,862 78	68,858 91	4½ "	2,094
Locust street, Nineteenth to River Schuylkill.....	3.0 feet.	2,270 feet	2,270 "	8,469 86	4,892 44	7,861 80	5 "	696
Miffin street and Montgomery ave- nue.....	10 "	1,093 "	1,093 "	43,947 72	2,770 28	46,718 00	5½ "	483
Seventeenth street, Vine to Spring Garden.....	3 "	1,670 "	1,670 "	4,195 43	1,817 57	6,013 00	6 "	528
Twelfth street, Christian to Ship- pen.....	3 "	1,014 "	1,014 "	1,424 77	1,916 08	8,340 80	7 "	1,071
Thirty-sixth, Warren and Thirty- seventh street.....	3 "	956 "	956 "	2,833 73	1,589 27	4,423 00	7½ "	1,110
Washington avenue, Broad to Seven- teenth.....	3 "	1,850 "	1,850 "	8,054 37	1,075 43	4,129 80	8½ "	671
Walnut street, Thirty-third to Thirty- eighth.....	3 "	2,433 "	2,433 "	7,408 22	4,861 53	12,269 75	10 "	1,093
Alteration (cave) Eighteenth and Vine.....	7 "	152 "	152 "	3,265 80		8,265 80		
			21,610	\$154,987 35	\$37,701 23	\$192,688 58		21,610

The eastern Cohocksink sewer, located on Laurel street, from the Delaware river to the creek, was commenced in May last, at the river end, and at once it was found necessary to contend with quicksand, a material of all others most dreaded by the engineer in works of construction. In this case it was particularly to be dreaded, as the sewer lies in a street fifty feet wide, built upon both sides; recourse was had to such expedients as were thought judicious to prevent not only the loss of the houses upon the street, with its attendant expense, but any delay in the completion of the work that such difficulties would entail upon us. These expedients have been successfully carried out by the contractor so far, and I trust that we may yet accomplish our work, without in any serious way affecting the structures upon its line. The expense will, of course, necessarily exceed what had been estimated for this work, as quicksand was entirely unexpected. We have now laid in this work 300 feet of sewer, 169 feet of which has been changed in form from that designed, for the purpose of narrowing the excavation between the houses. At Beach street we will return to the shape originally designed, a flat, elliptical arch, on account of the low elevation of street grades. I see no reason why this work should not be completed during the year 1870.

The sewer upon Mifflin and Montgomery streets, which we feared would in its construction be attended with many difficulties from freshets, being in a narrow open channel, has been successfully completed without the occurrence of any flood to interfere with its progress. This has been most fortunate, as that stream (Cohocksink) frequently rises so as to fill the channel to its highest level, with a torrent capable of carrying off any incomplete work that would oppose its current. We have on this line done more work of embankment than was originally provided for, rendered necessary as a protection to the brick and stone work in the sewer.

The upper Cohocksink, or that section lying between Ninth and Berks streets, and Dauphin and Sixteenth streets, is the largest work of the kind that has ever been constructed in our City. For its greater length it lies in the valley of the stream, but at Eleventh and Broad streets it is a cross country line, subjecting us to heavy rock cutting. It has been worked with great energy, and been well done; that portion under the Germantown Railroad required great cau-

tion and experience, as the risk was an unusual one, the railroad company would assume no liability whatever, thus throwing the entire burden and responsibility upon us. To insure safety to the very many heavily laden passenger trains crossing this opening, we erected a Howe bridge with three trusses, under which, with heavy shoring, our work was completed and the gap in the railroad filled without the slightest accident. This work will be completed about the first of April.

The sewer upon Broad and Tioga streets has also been finished, without meeting with any difficulties of moment. Its completion prepares a large area for building purposes, and increases very materially the value of not only the vacant ground through which it passes, but also each and every improved property on Tioga street, as far as the township line road.

The Brown street sewer, though small comparatively as to capacity, extending from Franklin street by way of Eleventh street to Parrish street, was built to correct the imperfections in the Parrish street sewer, by cutting off its drainage west of Eleventh street.

This was a particularly troublesome piece of work, as it was found necessary to lay the sewer in quicksand rendering close street piling and a wooden cradle the entire length of Brown street. The care and attention bestowed upon this work saved us heavy expense in restoring curbs and footways.

The Mill Creek Sewer, the largest that will be required within our City area has a capacity of 302,000 feet per minute, and drains an area of 4,600 acres. It was commenced during the summer, and so far has progressed uninterruptedly. At Spruce street there are 400 feet of invert completed, lying in the open valley; and in the heavy rock excavation between Spruce street and the Baltimore Turnpike, there is a heavy force at work, not only opening up a trench for the sewer, but obtaining material for the energetic prosecution of the work as soon as the weather will permit the use of mortar. This work is subject to great danger from floods, and will require, on the part of the contractor, the greatest watchfulness and care, so as to be ready for any emergency.

The alteration of the sewer at Eighteenth and Vine, with the branches constructed on Seventeenth and Eighteenth streets, for the purpose of intercepting the surface-flow which accumulated at Eighteenth and Vine streets, has, we believe, corrected the difficulty; but as some complaint has been presented that the cellars in the neighborhood have back water forced in them in times of heavy rain fall, I must say that so long as their connections with the sewer and cellars are below flood level in the sewer and unprotected by a valve, this must occur. The City cannot be expected to construct a sewer of such width as to reduce the flood level inside of it sufficiently to prevent a head of water upon these connecting drains.

The sewers built on Eleventh, from Christian street south, and on Twelfth street, from Christian street north, though performing valuable functions, yet it may be owing to the want of care in keeping the inlet free, they do not fulfil the duty expected in preventing the flooding in the basin at Twelfth and Washington streets. We would therefore recommend that the old sewer on Twelfth street, from Christian street to Washington street, be replaced by another of larger capacity.

The bridges are generally in good condition, those on the Wissahickon are all in order, and having been roofed and weather boarded, may be considered secure for many years, so far as regards durability of material.

The Falls Bridge over the Schuylkill river is in good order, and is kept clean, a most important point for timber bridges, particularly.

The Girard Avenue Bridge is by no means in a satisfactory condition. The western span is trestled at the abutment, and I believe the arches now carry the most of the load, in fact, without them, the trusses could not, in their present condition, be safely entrusted with that duty. The importance of this bridge has greatly increased during the past year owing to the opening of Fairmount Park on the west side of the river, as the travel has as many as 1,500 vehicles, crowding it to its utmost capacity, with two lines of carriages for several hours during the afternoons; it becomes a matter of the utmost importance, that so thronged a thoroughfare as this needs must be, should be as to security in all points

reliable. The renewal of this bridge is a matter for early consideration.

Some repair is required on the Suspension Bridge at Fairmount, and was it not, that Councils have within a short time, approved a plan for a new structure at this site, I should feel compelled as a precautionary measure to suggest renewing the cables of the present bridge, not that there is any particular reason to doubt their security, but because there is no means of knowing what their condition is. The early erection of the proposed structure is most imperative for the protection of our people who are driven of necessity to the use of Bridge street in reaching their residences and places of business, and are now subjected to the dangers of crossing the Pennsylvania Rail Road.

The Market Street Bridge is in good order, but its roadway should be kept more from the accumulation of the street dirt. A renewal of its roadway planking will be necessary at no distant day.

The Chestnut Street Bridge should be painted throughout and the western approach be raised to the grade level. It is to be hoped that the embankment forming this roadway will have now reached a sustaining point in the marsh on which it was made. The want of regularity in this roadway and footway detracts much from its appearance.

The Penrose Ferry Bridge is again in ruins, having had its northern draw pier destroyed by the almost unprecedented freshet in the Schuylkill river, which occurred on October 4th, last. The draw and the approaches are still standing and in good condition, but the long span (200 feet) and its outer pier are gone. Measures will be taken at once for its reconstruction, as Councils provided for it in the appropriations for the current year.

The value of the records made in the Registry Bureau, are being more and more appreciated as it becomes better understood, and the only want we perceive in the system as originally designed, is, that of an index for early and rapid reference, so that property may be found by the *name of owner* as easily as we find the name of owner from the property. The use of our books to verify ownership in matters of security, whether offered for official incumbents, or as bail at Court, is not so generally adopted as we believe it should be ;

for any questionable assertion as to ownership could be verified in a very short time by a certificate from this department; and if the property owned and submitted is not registered, it should be.

We have now received and filed in the Bureau, 127,893 descriptions of property, of which 10,890 were filed the last half year of 1865; 29,110 in 1866; 54,537 in 1867; 17,584 in 1868, and 15,935 during 1869. Of these 82,716 are plotted in atlas. To show that the law is being carried out with greater attention, we have during 1869, 8,450 transfers of property filed, or nearly double the number returned in the three and a-half years preceding. Of the 45,117 descriptions not plotted, it is proper to say that the larger proportion of them are in the rural wards.

The further improvement of Broad street has been retarded on account of the construction of the sewer between Somerset and Ontario streets, but will so soon as spring permits, be continued so as to reach Germantown avenue the present year.

There has so far been expended by the City on Broad street, \$75,700 95, as follows:

On graduation,	-	-	-	-	\$26,627 50
On curbing, paving and macadamizing,	-	-	-	-	12,823 23
					<hr/>
					\$39,450 73

Above Germantown avenue to Fisher's lane, the graduation and bridging has cost \$35,250 25.

The construction of the bridge over the Reading Railroad, now authorized by Councils, will open this street as a desirable thoroughfare to Fisher's lane.

It is a matter of regret that the further improvement of the carriage-way of Broad street has been entirely suspended, owing to the decision of the Supreme Court in the matter of the Nicholson pavement laid between Coates street and Columbia avenue; upon this contract there is yet unpaid \$ held by the contractors in assessment bills against the property fronting on the paving. The contract under which this work was done extended southward to Willow street, but as soon as the views of the Court were known, all work was suspended.

I feel assured that this street could be made a most attractive avenue by the improvement of its carriage-way, and that the City would be more than repaid by the increase in the assessed value of property upon its line.

By authority of an ordinance of Councils, this department has now under examination the matter of improving the carriage-way of Market street; the survey is completed, and the examination made shows that there is no difficulty in proceeding with the work of that part lying east of Eighth street, so soon as the necessary authority shall be given by Councils. Westward of Eighth street no acceptable plan can be devised until it is decided what can be done with the freight railroad now occupying the middle of it.

As relates to the eastern section, it is proposed that the footway be made uniformly nineteen feet wide instead of sixteen feet, as now, between Eighth and Third streets, and fifteen feet eastward of Third street. This will give a carriage-way of sixty-two feet, or the same as it now is westward of Eighth street. The increase of three feet to the footway to Third street, and of four feet eastward, will be of great advantage in affording greater facilities for business. An adjustment of the passenger railway tracks will be necessary, but I feel assured that the Company will give all assistance to so valuable an improvement.

The cost of this work, with a proper pavement for the carriage-way, will be approximately \$75,000; as to the character of the paving for this street, as it is intended exclusively for heavy business traffic, it is suggested that it be granite block, laid under close specification, and a *still closer inspection*.

In a report submitted by myself to Councils upon the subject of carriage-way paving, of date February 20th, 1868 (see p. 464, vol. 1, Journal C. C.), the relative applicability of stone and wooden pavements was alluded to, and so far nothing has occurred to cause a change in those views; what is wanted with us is a proper inspection of work during construction; the drawing of specifications and appending them to contracts executed, is a mere matter of form, as the contractor is practically his own inspector, and until such inspection is provided, our street paving, let it be of whatever character specified, cannot meet the requirements.

In paving, much work has been done by and under individual authority, particularly in cubical blocks. The propriety of this I very much question, as under such arrangements no regard whatever is paid to the specification for such work that Councils have adopted for the government of their officers. And the remark with reference to sewers will be applicable here, *i. e.*, that all work of public character should be made under the immediate charge and supervision of the department entrusted with that particular duty. The material for paving and the best method of its application is a subject of great moment for the consideration of Councils; the roughness of the cobble-stone, its want of cleanliness, with the difficulty of having it properly laid, as it is probably the most difficult pavement to lay well, and but few who have not examined the matter can estimate what effect a change of paving on our 326 miles of paved streets would have, and as items in this estimate, I would suggest, the increase of life for horses (therefore their enhanced value), the decreased cost of shoes, the increased load they could transport within the same limit of time without greater exertion (thus facilitating business), the reduction of wear and tear on vehicles (thus increasing their durability and the increased comfort not only to those using the streets, but to those residing upon them). These items reduced to dollars and cents will, in the magnitude of the amount, be surprising.

The horse-paths of our passenger railroads show a most objectionable feature of the cobble pavement, as from its constant use the stones become so slippery that it is a matter of difficulty for the horses to keep their upright position. It is surprising that the injury thus suffered by the horses of the Companies has not suggested the importance of experimenting with surface more fitted to their use.

The business of the department has been increasing each year since its organization, but for the past two years the additional duties imposed upon the head of the department, as a member of the Fairmount Park Commission, the Commission for Erecting Public Buildings, and as Engineer of the South Street Bridge Commission, have necessarily encroached upon the time usually devoted to the specific duties of the department, and it has therefore been impossible to attend to more than the generalities, leaving the details and

the direct personal supervision of works under construction (such as the main sewers now building under Ordinance April 24th, 1868) to the draftsman of the department, who, fortunately for us all, is an experienced civil engineer.

The duties of this officer, strictly speaking, lie at the department, and consist in the preparation of such plans and designs as may be necessary, under the direction of the Chief Engineer and Surveyor, but owing to the circumstances detailed preventing the personal attention of the head of the department to the construction works, other and more responsible duties have been delegated to the draftsman, and I have had to draw upon the force engaged in the Registry Bureau for a draftsman in the office, so that the current business may be transacted.

Those familiar with the department are perfectly aware that a large portion of the time of the Chief Engineer and Surveyor, during ordinary office hours, is consumed in explanations and answers to those seeking information in matters pertaining to the department, and that his prolonged or continued absence from the office would result in delay and at times to great inconvenience.

Was there an Assistant Engineer authorized for this department, with a salary proportionate to his responsibilities and the experience he must bring to successfully perform his duties, the department would be relieved of a great burden.

Respectfully submitted.

STRICKLAND KNEASS,

Chief Engineer and Surveyor.