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DEPARTMENT OF THE INTERIOR
GENERAL LAND OFFICE
WASHINGTON

ADDRESS ONLY THE
COMMISSIONER OF THE GENERAL LAND OFFICE

February ,1912.

The Honorable
The Secretary of the Interior.

Sir:

I desire to submit for your consideration a few comments pertaining to the subject of consolidation of the subdivisinal or cadastral surveys of the public lands and the topographic survey of the same area under one administrative official, and to correct, if need be, such erroneous impressions and conclusions as may have been formed as a result of the many extravagant statements and highly colored arguments which, unfortunately, have been advanced by the Geological Survey in support of its contention that in the interests of economy and efficiency the Land Office surveys should be transferred to that bureau.

The surveys carried on under your Department may be grouped under three general heads:

1. Those made for jurisdictional purposes, or the rectangular surveys executed by this office.

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2. Those made for general purposes, or information surveys made by the Geological Survey.
3. Those made for construction purposes, or the engineering surveys of the Reclamation Service.

These three classes of surveys are made each for a distinct and definite object and form the basis of future activity and development along distinct and separate lines.

The rectangular survey executed by this office is primarily for the identification of lands for disposal. Its object is to supply an immediate demand which is expressed by settlers, the States and other bona fide applicants, and, therefore, its location is not optional but mandatory. Its result is a permanent physical designation upon the ground and a plat on which all disposals and the manifold work incident thereto are based, and also a record of surveys in the form of field notes upon which, in conjunction with the plats, all matters involving conflict or property rights are based.

The topographic survey of the Geological Survey is primarily for the purpose of acquiring certain information relative to the earth's surface. It is made for general purposes, - scientific, industrial and military, and is conducted in accordance with a definite plan formulated with a view of attaining an

ultimate result. The direction of its expansion is optional to a large degree. The sum total of its product is a map.

The engineering surveys of the Reclamation Service are surveys made in great detail preliminary to the construction of the engineering works. Their usefulness is local, their finality an irrigation project.

It would therefore appear that these three branches of surveys are the bases for works so widely divergent in character and are so intimately and intricately associated with the accomplishment of that work that they are in fact an integral part of the work as a whole. The Reclamation Service in the construction of a dam may make engineering surveys over areas on which both rectangular and topographic surveys may have been extended, and because of the different object of the engineering survey no duplication of work exists. In fact it was because of the dissimilarity of object and result that the Reclamation Service was separated from the Geological Survey several years ago and was made a separate bureau. The Geological Survey in extending its topographic surveys with the object in view of preparing a topographic map of the United States established astronomic points and

triangulation stations on areas already covered by the Land Office net, and will necessarily continue to do so on unsurveyed areas by independent triangulation parties whether the rectangular surveys in future are executed by the Geological Survey or not. There is no duplication of work here, and could never be because the object of each survey is distinct and separate.

The Land Office in administering its duties under the organic act fixes the locus of all lines of the rectangular survey with reference to existing legal corner monuments, and preserves the integrity of all areas involving vested rights. In carrying out this policy it so happens that the locus of new lines does not necessarily agree with a theoretical fixation referred by triangulation to a distant astronomically determined station. It would perhaps be better for map making purposes if it did, but contrary to fundamental law if arbitrarily made to do so. So in all surveys made under this office involving political and private boundaries, especially in fragmentary townships and small irregular tracts (so many of which are now before this office for survey) the primary object is the fixation or reestablishment, as the case may be, of

the lines in question. This would have to be done by a field party no matter how many surveys for different purposes had already been extended over the area. It is true that a legal fixation of this character would not define the position of the lines on the earth's surface, but the primary object of this office in fixing their legal position on the ground would have been accomplished. Whether their position on the earth's surface was desired for map making purposes at the time of the cadastral survey, or later, such information would necessarily be gathered by a separate party. There would be no duplication of work, nor would there be any economy in having the two classes of surveys done at the same time. In fact the demand for the land survey may come at a time remote from that of the triangulation survey, and an attempt at simultaneous action by the two parties might result in serious interference with the plans of each and in increased cost.

On the other hand, each class of survey in fulfilling its mission may, without swerving from its main purpose, economically acquire data useful in furthering the work of other bureaus or even simultaneously, with increased force, execute in their or-

tirety certain surveys which while non-essential to the attainment of the ultimate result of one can be used in furthering the consumation of the general plans of the other. Such instances, however, are not frequent, and although they afford little opportunity for an increase of efficiency, do afford an opportunity for economy in that the cost of maintaining one camp for two field parties is less than that for two independent parties.

It was with this central idea in mind that in my annual report 1911 to you I submitted the recommendation that authority be given the Commissioner of the General Land Office to execute a topographic survey in connection with and at the same time as the rectangular survey, as is being done under my direction on Indian reservations. I called attention to the advantage and assistance such a survey would be to those desiring to make Cary act and other selections. With authority granted by law to make topographic surveys in connection with rectangular surveys wherever feasible and desirable this office can without departing from the course based upon its fundamental reason for existence, without retarding the rectangular surveys or impairing their of-

iciency and without invading the province of operation of other bureaus of your Department, provide for the combined survey this season.

The lands of the western States yet to be subdivided may be grouped into two general classes with reference to the feasibility of executing topographic surveys in connection with rectangular surveys:

1. Tracts of from seven to twelve townships in a contiguous body in the several States for which Congress has made special appropriation, railroad land grants and Indian reservations.
2. Tracts of from three to four square miles in extent to one township, or occasionally two, which are generally isolated, irregular and widely separated from one another.

As all rectangular or cadastral surveys are based, under the law, upon the demands for survey as expressed by settlers, the several States, railroads and other bona fide claimants, each group of subdivisional surveys so formed must be treated separately and as an entirety, for there is no assurance of when new surveys will be connected thereto.

Of course topographic surveys in connection with the rectangular surveys could be made by the General Land Office of the entire territory yet to be subdivided from an engineering point of view, but the two

surveys can not be made simultaneously of the entire territory by any bureau in keeping with the well recognized principles of business and the present law, nor would the unification of purpose of the Land Office be preserved if topographic surveys on such a scale were undertaken by this office, and the efficiency of the topographic branch of the Geological Survey would undoubtedly be impaired by the adoption of such a plan. In certain districts where it is possible to get sea level datum to the field of operation without bringing in a long line of levels from some distant point the plan of executing a topographic survey in connection with the rectangular surveys under my direction would be feasible, economical and efficient.

The territory most favorable to the combined survey is that within the railroad land grants of the transcontinental lines, because of the fact that such lands are nearer the plane of reference for vertical control. Next in order of feasibility for survey are Indian reservations and certain areas in eastern Montana, southern Utah, southeast New Mexico and parts of Idaho, comprising of from seven to twelve townships in a contiguous body.

By reference to my plans for surveys this coming season, it appears that the territory mentioned above as

fitted for the combined survey comprises about one-third of the entire area which the rectangular survey will be extended. The other three-quarters are fragmentary townships situated in localities where the cost of obtaining the vertical control element would perhaps equal that of the cost of survey. It would be difficult to estimate accurately the cost of topographic surveying even on the area selected, as everything depends upon the locality, the work involved in obtaining control, the character of the country and the contour interval, but it is reasonable to assume that the cost of the topographic survey will be about 30 per cent. of the whole, or about 40 per cent. of the cost of the rectangular surveys. This estimate of the cost of topography is very liberal. In favorable country the levelman would not be needed; one of the traversemen would do the leveling, and again if several groups were in reach by backboard of one another one levelman could do all the work. I have, however, based my estimate on probable existing conditions.

In cases where it is impracticable to get precise vertical control without great expense it has been suggested that the contour survey could proceed on an assumed datum, the map so produced being relatively correct within itself, and at some later date be corrected to true datum

when sea datum levels were brought on to the area. This correction and adjustment could readily be made in country of bold relief, but in rolling and plains country, it of course, could not be done, and therefore in such country it would be necessary to carry in a line of spirit levels, which procedure would add to the expense in accordance to the distance from a determined elevation, and of course would involve a separate camp for the level party. However, it is manifest that the combination survey in small isolated districts would not be in keeping with the spirit of efficiency and economy and should not be undertaken; but in districts where conditions favorable to the combination survey exist, and township or a number of townships when topographically surveyed by this office could be assembled and reduced in scale to make a sheet of any part thereof as now published by the Geological Survey without any additional field preparations further than extending the United States Geological Survey triangulation system to the area and the Land Office net connected therewith for the more accurate determination of latitude and longitude. The topographic sheet when thus covered by land surveys and topography done in connection therewith and adjusted to triangulation control by the United States Geological Survey will give a map gridiron with the Land

Office net as primary horizontal control which is far in excess of any control at present used by the Geological Survey in its preparation of topographic maps, and will possess the further advantage of having the control lines marked on the ground every half mile instead of only two or three triangulation stations marked on sheets of approximately 800 square miles, as is the present practice of the Geological Survey. Their traverse lines are not permanently marked and serve no purpose further than their use in the preparation of the map.

Then again it will be remembered that a portion of the territory to be subdivided has already been mapped by the Geological Survey. If rectangular survey plats (without contours), of this are made, and projected on the previously made topographic map the relation of land corners and topography in detail would be inaccurate unless the topography in the first instance is extremely precise, which is never the case in detail sheets. All topography possesses, more or less, inaccuracies, except in the immediate vicinity of control lines. And further, the Land Office plats are made on a scale of two inches to the mile while the Geological Survey maps are on a scale of about one-half inch to the mile, and it is uni-

versally recognized as bad practice for reasons too obvious to be stated to enlarge a topographic map, even if it would agree with the rectangular survey. If a contour plat is made in connection with the subdivisional survey of an area already topographically surveyed it would be necessary to make the adjustments and corrections with any additional detail in the field.

I mention these various phases of the case with a view to showing that practically the problem before the Department is quite different from the theoretic conception of the case by the Geological Survey. It is evident that in all districts where the combined survey would be feasible and desirable this office, without departing from its fundamental purpose, can economically substitute for the hachure plat a plat with contours which can be used in the forwarding of the central scheme of the Geological Survey. Thus each bureau remains unhampered by the necessity of undertaking tasks irrelevant to its central purpose and is free to efficiently respond to legitimate calls made upon it. There is no duplication of work in the plan I have suggested and there is a promotion in economy and efficiency over the present method.

In its report of a plan for the consolidation of

the two surveys under one administrative head to the Chairman of the Committee designated by the Secretary of the Interior dated February 23, 1912, the Geological Survey presents arguments tending to show that the rectangular surveys should be turned over to that bureau. The gist of the plan suggested therein is that the present field force of this office be transferred to the Geological Survey in so far as the engineers and surveyors in the classified service are concerned, and operate under the direction of the topographical corps of that office, "the members of which devote their entire time to this (topography) specialized class of work."

The Geological Survey further proposes to prepare all groupings of territory to be surveyed, all special instructions and diagrams for surveying, and the Director to assume all responsibility for the execution of the work.

It is only fair to the Geological Survey to say that because of its unfamiliarity with the very nature of our work and the vital importance to settlers, land owners and States in general, it does not realize the magnitude of its undertaking. It contemplates the survey of large independent tracts such as it has had ex-

perience with where the conditions were ideal, where the problems of surveys were simple and regular, where no legal questions were involved and where the demands for expedition were none other than the usual demands in the interest of good administration. Naturally its estimate of the surveys now being prosecuted by this office is based upon its own experience in the Indian Territory in 1895-07 and in other districts where, because of the absence of complications an elementary knowledge of land surveying was sufficient. With the exceptions of several Indian Reservations and Alaska there are no districts where such ideal conditions exist.

The surveys now before this office involve problems of independent, dependent and metes-and-bounds resurvey of private land claims, school sections and State land selections, which must be executed in accordance with the State and Federal laws, problems of hiatus and overlap, which frequently are referred to the courts for settlement; fragmentary surveys as a basis for legal decisions involving vested rights, small holding claims, etc., all of which require expert treatment both in the matter of survey in the field and in final action in this office. To handle this work I have organized a corps of engineers recruited from the ranks of the best of the surveying engineers

formally under this office. These men have specialized in this particular class of work, and because of their many years of continuous service have kept in close touch with the various and intricate problems which have necessarily evolved a method and order of procedure of a high and precise standard. Indeed, I believe that few of us realize fully the magnitude of the problems yet before us and the caution and care that must be maintained in dealing with them. No one questions the ability of the topographers of the Geological Survey who "have devoted their entire time to topography," to make topographical surveys. Some of these men, sixteen or seventeen years ago, may have known how to conduct "regular" rectangular surveys in the Indian Territory. I am willing to presume that they did. But even if they possessed this knowledge at that time it will hardly be reasonable to assure that they and others who have had no experience in land surveys could properly conduct the surveys at the present time. In fact the parties on the Indian Reservations, executing the combined surveys in its simplest form under my direction, are in charge of U. S. surveyors who are paid nearly double the amount paid the topographers in the same camp. I cite these apparently trivial facts merely in the endeavor to show that the ideas of the Geological

Survey relative to the work of this office are vague and visionary.

The plan formulated by me is calculated to meet an existing condition, that, by the Geological Survey, to meet a theoretical one.

Engineers familiar with the topographical work of the Geological Survey and the rectangular work of this office under the direct system, are unanimous in their opinion that the latter is far more difficult and complicated than the former. If the rectangular surveys were placed under the topographic branch of the Geological Survey it would mean that they would be subordinate to the topographic survey, that there would necessarily be a conflict of endeavor because of the conflict of demand for survey to the detriment of the subdivisional work and that the fundamental purpose of both bureaus would be defeated because of the incompleteness of one and of the diversity of purpose of the other. In fact it would be just as feasible to transfer the engineering surveys of the Reclamation Service, which consider various elements of the work to be constructed, to the Geological Survey, as to place the subdivisional surveys of this office under that bureau; and further, the position of a constructed dam on the earth's surface

is just as important as to location on a map as are the land surveying lines, and yet, because of this fact, it would be desirable to transfer the triangulation work of the Geological Survey to the Reclamation Service or to this office to accomplish this purpose. No, the engineering surveys properly belong to the Reclamation Service. They are essential preliminaries to a definite finality. Triangulation surveys properly belong to the Geological Survey. They form the framework around which the final structure is built. The land surveys properly belong to the Land Office because they constitute the beginning of a definite purpose finally consummated by that office.

I had hoped to confine my comments to broad general lines of public policy with a view to assisting you in arriving at a conclusion based upon a knowledge of conditions as they exist today. I had hoped that it would not be necessary to invite your attention to the many extravagant statements made by the Geological Survey in support of its claim, and which, while not convincing, may perhaps have some influence unless shown in their true light.

I realize that it is no simple task to hold the mirror up to nature, and that it is far more difficult to

poise it properly before one's fellow—man, and yet, difficult as this task may be, and as reluctant as I am to criticise statements emanating from a sister bureau, and with whom my office is in most friendly accord, I do not feel that I could be true to your policy of promoting the economic efficiency of the surveying service under your Department did I not attempt to at least briefly sketch the reflection which confronts me.

On page 401 of the hearings before the subcommittee of the Sundry Civil Appropriation Bill 1912, the Director of the Geological Survey has reprinted his letter to the Department of July 22, 1910, covering the work of the Survey in establishing the boundary line between Idaho and Washington. The purpose of the Director in reprinting this article in the hearings is to laud the work of the Geological Survey with a view to showing that it is able to do the work of the General Land Office more expeditiously and cheaper than this office can do it itself. The statement was made that, in round numbers, 177 miles of boundary was established at a cost of \$22,701.00. This is upwards of \$128.00 per mile, but the last figure is not given in the report. The statement, however, is made that, "there is thus left an unexpended balance of \$1,200.10, or, approximately, 9 per

cent. of the amount appropriated from what would have been expended had the contract been given to an outside contractor." The inference from this statement is that if contractors were allowed to bid I would not have been able to get a contract at terms at a less cost in the aggregate than the total amount of the appropriation. This is wholly unwarranted and contrary to the experience of this office. The history of this office shows that it invariably secures bids at a less rate, especially during recent years, than the total appropriation for surveys of this character. We usually estimate enough as a matter of good administration. We were not, it will be understood, allowed to ask for bids in this case, the matter being turned over to the Geological Survey.

I wish to also invite your attention to one other short State boundary line surveyed by the Geological Survey, namely, that meridian line between the summit of the Bitterroot Mountains and the Canadian boundary. This was done some years ago, the 70 miles being done at a cost of \$7,650.00 or over \$109.00 per mile. The report of the Geological Survey in its bulletin covering this work states that this cost does not represent the entire expense; animals, outfits, etc., being transferred from other localities and not paid for out of the appropriation for this

survey. The report states that but for these facts the cost would have been "more than two fold" or \$218.00 per mile.

I wish to state that in connection with State boundary surveys by this office that contracts were let to bidders who were compelled to purchase their own animals and equipment of all kinds. The price paid the contractor represented the entire cost of the survey including the plats and field notes thereof.

I wish to invite your attention to some comparisons I have made of the cost of boundary surveys executed by this office and those mentioned above. The survey of the boundary line between Colorado and New Mexico was executed by the General Land Office at a cost of \$75.00 per mile. The cost of the Utah-Arizona boundary line executed by this office was also \$75.00 per mile. These boundary lines being parallels of latitude the contracting engineers were of course under the additional expense for the necessary astronomic work in connection therewith. The Wyoming-South Dakota boundary line was executed by this office at a cost of \$82.00 per mile, and with reference to this boundary I wish to state further that there were established mile monuments consisting of large hewn granite pillars properly marked, costing from between \$18.00 and

\$20.00 a piece. Monuments of this kind have not been used by the Geological Survey nor by this office in other State boundary surveys with the exception of the boundary line between North and South Dakota that I am aware of. In this survey also the contracting surveyor was required to close all public survey lines upon the new boundary and establish closing corners thereon. The Idaho-Montana boundary survey beginning at the corner, established as the initial monument for the meridian line of the boundary survey by the Geological Survey running thus on the watershed of the Bitterroot Mountains and through the mountains southeasterly to the West boundary of Wyoming, was executed under contract with this office at a cost of \$93.00 per mile.

The California-Nevada boundary diagonal line was run by the Coast and Geodetic Survey, I believe, under a special act of Congress, but no permanent line was established thereon (see Appendix 3 of the report of the Coast and Geodetic Survey for 1900). The cost of the preliminary line was \$75.00 per mile. If the Coast Survey had been required to put up monuments similar to those used by this office in establishing the boundary line between Wyoming and South Dakota the cost would have reached considerably upwards of \$100.00 per mile.

The Texas-New Mexico boundary line of 520 miles was run by this office last season at a cost of \$20,000.00, or at the rate of about \$38.46 per mile. The estimate of the Geological Survey for this same boundary line was \$50,000.

You will observe from these figures that in all recent contract work under this office, and so far as I know in all contract work of the past providing for the survey of State boundary lines the cost has never exceeded one hundred dollars per mile, and is usually materially less, no matter what kind of monuments have been required or what retracement or reestablishment of closing corners were needed to make the survey complete.

In the two cases where the Geological Survey surveyed boundary lines, and about which considerable comment has been made as to their cheapness and the character of the work, it has considerably exceeded one hundred dollars per mile, and on its own confession if it had been required to meet all expenses and perform all the work required of our surveyors, the prices would have run up as high as \$218.00 per mile.

As I have stated it was not my intention to call your attention to these matters. When the Geological

Survey filed its report last July, a year ago, I had no idea that the matter would be exploited in Congress to our injury by filling the minds of the Committee and the general public with a total misapprehension as to the actual facts covering the survey of State boundaries by this office.

Another inference from Director Smith's testimony before the Committee is that the State boundary work of the Geological Survey is of considerable importance as to amount as well as cost and expedition. I have not made a comparison between the actual mileage of lines of this character surveyed by that bureau and those surveyed by this office, but I think it possible that the Geological Survey may have surveyed about one per cent. of the State boundary lines established in the United States.

I would respectfully invite your further attention to the testimony of the Director of the Geological Survey before the sub-committee of the House in the Central Sundry Civil Bill hearings on page 393 of said hearings the records of this office show that the total number of miles surveyed by the Geological Survey north of the Union Pacific Land Grant in Wyoming in 1907-08 was 399 miles at a cost of \$8,748.00, which is at the rate of \$21.92 per linear mile. It will be remembered that the Geological Survey on this

work used Government owned animals and equipment. The Director states that the average price paid under two contracts let by the General Land Office for surveys embracing about 30 townships surveyed in 1906 in the vicinity of Rock Springs, Wyoming, was \$15.00 per linear mile, and that in addition to this the surveyors were paid \$2.50 apiece for handling and setting iron posts (which would be \$8,250.00 for 30 townships); also, that the cost of the examination of these surveys by this office amounted to \$125.00 per township or \$3,750.00 for the entire group, and that the cost of the supervision of the surveyors general will easily average \$100.00 per township.

Relative to the above testimony the records of this office show the following facts:

No surveys were made in Wyoming in 1906 by this office upon which iron posts were set, and it is therefore presumed that the Director refers to two contract surveys executed in the vicinity of Rock Springs in 1907. The total liability of these two contracts was \$24,948.00.

It will be remembered that the surveys executed by the Geological Survey were original, "regular" sur-

veys, while those executed by contract were resurveys involving a combination of independent, dependent and metes-and-bounds surveys of private land claims, school sections and State land selections, and it is estimated that about 2500 miles of line were run at a rate of \$8.90 per mile. Nothing was paid to or claimed by the contract surveyors for handling or setting iron posts, as stated by the Director, and the total cost of the field examination was about \$1200.00, or less than one-third the figure given in the testimony. The alleged supervision by the surveyor general consisted of the preparation of the contracts and bonds by him, and are properly classed as office work and was not paid out of the surveying appropriation. Therefore, the total cost per mile for the surveys mentioned, including the examination, was in fact about \$9.34 per mile and not \$21.00 per mile as would appear to be the case from the Director's statement that each township cost \$1500.00.

I am loath to believe that part of the testimony in which it is stated that many of the iron corners of the contract surveys in this vicinity are not even set, or, if so, are merely propped by two stones, for the reason that these surveys were examined by our experienced examiners before acceptance by this office, and

were reported correct. I may state in this connection that there is no record proof whatever of the correctness of any of the surveys executed by the surveyors of the Geological Survey for this office.

I do not wish to appear in the light of offering a defense for the contract system. I merely wish to show that in spite of the contract system this office has always executed surveys at less cost than the Geological Survey has been able to do.

Since the date of the incidents mentioned above other statements made in the discussions before the departmental sub-committee and elsewhere have been of such a character as to warrant me in the belief that the Geological Survey is either purposely unfair in its attitude or else so grossly ignorant of the present conditions as to render its opinions valueless. The Director deploras the faulty condition of the older rectangular surveys, complains of the annoyance they have caused his office, and infers that the present system is responsible for this condition. No one is in a better position to realize the defects in and suffer from the effects of the erroneous and mythical land surveys of the past than I am. It is because of the character of these earlier surveys that the problems now before my surveying division are so

varied and intricate; it is because of them that the rectangular surveys of today are so highly specialized and require the services of the men who have specialized in this line of work; and it is because of these earlier erroneous surveys that my time and the time of my legal board is so largely devoted to the solution of the problems in connection therewith. Many of the early surveys were made and accepted without a field examination. Since the rigid examination system was inaugurated about twelve years ago far better surveys were made, but still the system was wrong, and with that idea in view I directed my efforts towards having it changed and the work done directly under my supervision. This was accomplished by act of June 25, 1910, and I need not further direct your attention to the flattering results obtained. The Director apparently loses sight of the fact that the contract system has been done away with, as he constantly refers to the defects in that system. These defects are being eliminated as fast as Congress will permit. It is difficult to say how the Geological Survey, with no experience in this line of work and the same amount of available funds, could more satisfactorily relieve the situation. We are confronted with a condition which, by reason of its intimate knowledge of, this office

is capable of handling. Unfortunately the Geological Survey persists in dealing with a theory which can never develop into a fact.

I might mention that many of the older surveys of the Geological Survey are just as faulty as those of the Land Office. Millions of acres of territory topographically surveyed by the Geological Survey have been resurveyed. I have before me the Director's annual report for the fiscal year ending June 30, 1910. On page 64 of this publication I note that the statement is made that 3,751 square miles were resurveyed that year. It will be admitted, I think, by the Director, that the sheets of thousands of square miles topographically surveyed by the Geological Survey have been since marked "reconnaissance," and have been, or, are being resurveyed, so it hardly seems in keeping with the spirit of fairness or indeed in harmony with the broad spirit of public good for which we should all be striving, for the Geological Survey to rise in virtuous indignation at the alleged short-comings of her sister bureau, or to create and spread the idea that the present system of this office is responsible for this regrettable condition. Fortunately, it happens, however, that the erroneous surveys of the Geological Survey, by

reason of their relative unimportance to present day purposes, are seldom heard of and have no perceptible retarding effect upon current settlement and development.

As I have mentioned before, it appears at times that the Director is under the impression that the contract system of surveying public lands is still in force. Arguments from that source have been advanced in condemnation of the independent survey system of the several States, which, it is claimed, are influenced by local politics and dominated by the local surveyor general. There is no foundation in fact for any such statement. Under the contract system the surveyor general lets the surveying contracts based upon competitive bids and subject to approval by this office. The fields of operation were then, as now, selected with reference to the legitimate demands for survey. There was no room for political preference. Under the direct system the surveying corps is under the supervisory corps of this office which is under my immediate direction.

It would be futile to attempt to recall and unnecessary to refute the innumerable petty claims to perfection advanced by the Geological Survey. As a matter of fact an investigation will develop that the Manual of

Surveying Instructions, under which all rectangular surveys are made, is issued by this office, that the standard field tables used so extensively by land surveyors were prepared under my direction, that the stadia was used for measurement on land surveys as far back as 1890, that the clinometer and long tape were first used extensively under this office, and that the iron corner posts, now universally employed, were recommended for use by the present Chief of the Surveying Division ten or twelve years ago.

Much prominence has been given by the Geological Survey to the feature of geodetic control in the establishment of land lines. This method was pursued by the Geological Survey in Alaska in 1910, a virgin country where the conditions were ideal and resulted in the resurvey of 112.1 miles at a cost of \$54,962.24 which amount does not include the cost of the preparation of the returns of survey. Wooden posts were set on these surveys, it being stated it was impossible to ship iron posts to Fairbanks in time to make them available for the season's work.

In the winter of 1911 the Geological Survey asked to be relieved of further work in Alaska on the ground that it did not care to have its expense account scrutinized by the Commissioner of the General Land Office. This office

then took up the Alaskan work extending the surveys commenced in the Fairbanks district by the Geological Survey and that inaugurated several years ago by the General Land Office in the Copper River district and initiating entirely new surveys in the Cook Inlet country. The Land Office efforts in Alaska in the season of 1911 resulted in the survey of more than eight times the number of linear miles and over sixty times the number of acres ready for disposal, than the output of the Geological Survey in 1910, at a cost of less than 70 per cent. more than the cost of the surveys executed by the Geological Survey. It will also be remembered that iron corner monuments were set on the surveys executed under my direction.

I would add that in connection with the Land Office surveys inaugurated last season in the Cook Inlet region, above referred to, the much vaunted accuracy of the triangulation system was found grievously at fault.

The latitude of the Seward Base Line, Alaska, established by the General Land Office, by reference to the triangulation system of the Coast and Geodetic Survey is $60^{\circ} 07' 25.8''$. The longitude of the Seward Principal Meridian, by similar reference, is $149^{\circ} 21' 53.1''$.

It will be seen by a reference to the "Reconnaissance map of the Northern Portion of Kenai Peninsula, Alaska," published by the U. S. Geological Survey in 1904, that a point plotted on this projection in Latitude and Longitude given above would fall in Resurrection Bay about one-half mile from shore, and west of the mouth of Godwin River. As a matter of fact the initial monument in the aforesaid latitude and longitude is about one-fourth of a mile north and one-fourth of a mile east of the northeast corner of Resurrection Bay or approximately one and one-half miles north and one-half mile east of the point as projected on the map of the Geological Survey. In other words, this portion of the map of the Geological Survey is in error about one and one-half miles for latitude and one-half mile for longitude, if the triangulation of the U. S. Coast and Geodetic Survey is correct.

Similarly the latitude of the fourth Standard Parallel North is $61^{\circ} 30' 37.5''$. The Seward Principal Meridian is Longitude $149^{\circ} 21' 53.1''$. The point defined by this latitude and longitude when projected on the "Reconnaissance map of the Matanuska and Talkeetna Region, Alaska," by the U. S. Geological Survey, will fall in Knik Arm of Cook's Inlet at a point about one-quarter of

a mile north and one mile east of the position of the same point when platted from its position with respect to topography of the village of Knik, near which village is the Coast and Geodetic Survey triangulation station.

It therefore appears that on these two adjacent quadrangles or maps that the position of the northeast corner of Resurrection Bay, as shown on the Geological Survey map, is about one and one-half miles north and one-half mile east of its true geodetic position, while the village of Knik is about one-quarter of a mile south and one mile west of its true geodetic position, or a total discrepancy of the two maps of approximately one and three-quarters miles in latitude and one and one-half miles in longitude.

No direct tie was made to the Geological Survey triangulation control by the Land Office surveyors, their ties being made to the Coast and Geodetic Survey triangulation stations, which, when platted on the Geological Survey quadrangles, shows the above mentioned discrepancies.

This is not an exceptional case, and is cited merely to show that material errors are sometimes to be found even in latter day Geological Survey work. Of course it will be contended by that bureau that this is reason-

naissance work, and that the territory will be more accurately surveyed before the final map of Alaska is published. Exactly, but can our rectangular surveys wait, as it would seem imperative from the Geological Survey plan, for the precise triangulation not, before being undertaken? They must be undertaken at once, and as we have no such elastic and convenient word as "Reconnaissance" to place upon plats discovered later to be erroneous, we must execute surveys correct in the first instance.

It all revolves itself back to the fact that the Geological Survey has no conception of the practical side of the question. This was evidenced in the suggestion (and I think I am justified in characterizing it as ridiculous) of establishing subdivisional corners in positions determined by plane table traverse, made several years ago. Equally absurd from a practicable point of view, is the assertion in the "plan" submitted by the Geological Survey to the chairman of the sub-committee appointed by you, that lost corners of the rectangular survey could be reestablished by reference to geodetic control. Lost corners of the public land surveys are reestablished by county surveyors under the laws of the several States and

upon the spirit of the several acts of Congress authorizing resurveys as construed by this office and by United States court decisions. The cost to the settlers is small and the result is satisfactory. The method proposed by the Geological Survey is practicable as an engineering possibility but the cost of such procedure would be prohibitive even if not in conflict with State laws.

In reviewing briefly the subject in its entirety, several features stand out preeminently against the background of intricate, although, essential detail.

1. The rectangular surveys are vital parts of the Land Office purpose as a whole.
2. The Land Office is dealing with a concrete condition.
3. The Geological Survey in advancing its contentions is dealing with a theory which might have been a fact sixty years ago, but which does not exist today and never can exist again.
4. The Geological Survey in advancing its claim to competency to handle the rectangular surveys in combination with its own has not based all of its claim upon facts.

My plans in general for surveying the public lands this season and if authority is granted to execute a topographic survey in connection therewith whenever feasible and desirable, are as follows:

1. The demands for subdivisional survey as expressed by settlers, the States and other applicants will

be met by the surveying organization of this office, consisting of 142 surveying parties operating in eleven public land States, Alaska, Nebraska and in other States where the Government has jurisdiction.

These surveying parties operate in the field either singly or double, each in charge of an experienced U. S. Surveyor, or Transitman, who in turn is under the supervision of the supervisory corps of this office which is directed by the Commissioner of the General Land Office. Accuracy, expedition and promptness in the survey of the public lands are imperative, and this office will continue to give precedence to this class of surveys.

2. Topographic parties will be added to each land survey party on the larger tracts, and will operate from one camp in charge of a U. S. Surveyor. In isolated districts and in groups of scattered and fragmentary townships and in all other localities where the idea and spirit of so-called non-duplication would be defeated without greatly increased cost over present methods, or where, because of unreasonable delay incident to the procurement of vertical control, a material retardation of the rectangular survey would result, a topographic survey would not be undertaken.

3. This office will continue to pursue the efficient, economic and precise method of survey it has developed as a

result of its wide experience and which has reached the highest standard of accuracy under the Direct System. All work is based on astronomic determinations with solar transits of the most approved make and design. Measurement by steel tapes and clinometers, checked by stadia, has given highly satisfactory results, and will be continued.

The locus of all lines of the rectangular survey will be fixed with reference to existing legal corner monuments now on the ground on which vested rights are, or may be based, and all lines of the rectangular survey will be used for the horizontal control for the topographic survey.

4. As the Geological Survey will necessarily carry on its triangulation work, whether it attempts the cadastral surveys or not, and, as the object of the triangulation survey is separate and distinct from that sought by the combined surveys and the time of its execution is optional, it would seem that the geodetic work in connection with newly surveyed groups might be left to the Geological Survey to be taken up when desirable. No duplication of work could possibly exist in such cases as in the fragmentary and scattered country before this office for survey, a separate camp for the triangulation party would be necessary. However, should any case present itself at any time where

it would be considered necessary to establish lines by geodetic control, this office is prepared to do so.

5. The plan under consideration for some time by this office of attaching the chiefs of field parties to the offices of the surveyors general in the several surveying districts will probably be adopted. This will enable the U. S. surveyors and topographers to develop the data collected in the field in the office, with the aid of the draftsmen of the office.

6. The operations of all field parties will continue under the supervision of competent engineers designated Supervisors of Surveys under the general supervision of the Commissioner of the General Land Office, who, in any event, must always remain the interpreter of questions of survey made for proprietary purposes.

It will be seen from the foregoing that the General Land Office proposes to carry forward its efficient and economic survey of the public lands and execute in connection therewith a topographic survey on such areas where such surveys would be feasible and desirable.

This office will survey from twelve to fourteen million acres this season (exclusive of linear surveys). As the cost of the topographic survey is about forty per

cent. of the cost of the rectangular survey and as about one-third of the entire area is susceptible to economical, topographic survey, an added appropriation of forty per cent. of one-third of the total appropriation for rectangular surveys will be sufficient to carry on the combined survey under the direction of the Commissioner of the General Land Office without retardation to the all important and urgent rectangular surveys.

Very respectfully,

Commissioner.