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THE NAVY INSPECTION SYSTEM

by

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THE NAVY INSPECTION SYSTEM

It has given me particular pleasure and gratification to receive, and to be able to accept the invitation to appear before you this morning I know something of the splendid work done here at the Industrial College under the leadership of Colonel Jordan and his predecessors, in connection with the procurement problem with which you of the Army and we of the Navy and Marine Corps must be prepared to cope in preparation for national emergency And I had already acquired a profound admiration and respect for this College even before the privilege was accorded me last May of personally meeting and being temporarily associated with your very able and energetic Director, the members of his staff, and of the class which graduated last spring I look forward with pleasure to a continuance of this association when you come to the Pittsburgh Area on your annual visit next spring, as I hope and understand you will do. I regret to say that I have not had the opportunity to take the course at the Industrial College, but my occasional association with the Army at the Naval War College, at Fort Monroe, in the Puget Sound Area and at our Embassy in London, has invariably afforded me both great pleasure and great profit, - not to mention my current pleasant association with your numerous colleagues and brother officers in Pittsburgh

In justification for my presence here this morning - or shall we say, apology? - may I say that while lacking the advantages of a diploma from this College, and all that that diploma implies, - of the 30 odd years since my graduation from the Naval Academy, approximately one-half have been spent on industrial problems, either planning or production, at Navy Yards, and considerably less than half, on various forms of inspection duty, in our own commercial shipyards, in foreign dockyards ard shipyards incidental to my duties as Assistant Naval Attache in Europe, and for the past year and a half as Inspector of Naval Material in charge of the Pittsburgh Inspection District

I have been asked to talk to you on the subject of "THE NAVY INSPECTION SYSTEM " This service came into being nearly one hundred and fifty years ago, when the attacks by French cruisers on our commerce in the late years of the Eighteenth Century prompted the Congress in 1794 to authorize the construction of six frigates, -

two of which still survive, although reconstructed, in the CONSTITUTION and the CONSTELLATION Naval officers were assigned to the ships in the early stages of their construction ultimately to man them when completed and commissioned, but initially to inspect both workmanship and materials, including the assembly of equipage, ordnance, naval stores and accessories. And this system has been carried down to the present day, although with numerous developments and amplifications to suit advances in complexity of design and materials involved in the transition from wooden ships, through iron and medium steel, to the ships of today, embodying the latest developments of the metallurgical and mechanical sciences

I ask your permission to digress for a moment at this point to picture briefly the historical background of the Navy, which has had so intimate and, may I say, important a connection with material development and procurement in this country, and to note that just as our national economic history has been characterized by recurrent cycles of prosperity and depression, so our national naval history has been characterized by similar periods of inflation and deflation of the Navy, with corresponding reactions both upon our international relations and upon the economic and industrial life of the country as the Navy procurement problems spread in ever widening circles from the seaboard to the great manufacturing centers of the interior

The United States Navy began then with the laying down of the keel of the CONSTITUTION in 1794 on the foundations of a fine naval tradition begun by John Paul Jones and his associates of the continental marine After the quasi-war with France in 1798, a series of brilliant exploits during the years 1803 to 1805 against the pirates of the Barbary Coast - of the Mediterranean, not San Francisco - and our successes in the War of 1812, there followed a period of retrogression, punctuated notably by a brief period of expansion during the Mexican War, and the opening up of Japan by Commodore Matthew Calbraith Perry in 1854, abruptly terminated by a tremendous expansion of our sea forces for blockading purposes, including control of the Mississippi River, during the War between the States After Appomattox, however, the Navy was again allowed to slump until it reached an almost unprecedented low during the 1870s, over a period in which our merchant fleet of clipper ships having likewise reached its peak of distinction, then also began to decline, owing to the advent of steam propulsion, iron hulls and the opening of the Suez

Canal, three factors fostered by Great Britain, incidentally, and operating greatly to her advantage Meanwhile in 1842, the Board of Navy Commissioners which had been established for administration of the Navy in 1815, had been superseded by a group of civilian bureaus for technical naval supply and maintenance Nothing approaching a General Naval Staff for control of fleet operations was to come for some 70 years thereafter.

In the middle 1880s, popular sentiment led to the creation of the so-called "White Squadron" of four rather small light cruisers constituting the beginnings of a new steel navy. There followed, fortunately for us, a continued up-building of the Navy throughout the early 1890s, so that we were in a position strong enough in 1898 to destroy the relatively weak and inefficient navy of Spain after the sinking of the MAINE in Havana Harbor

Profiting by the lessons of this rather "small time" war, and stimulated by our not too creditable successes against a weak adversary, the up-building of the Navy was continued at accelerated pace under the able administration of President Theodore Roosevelt, who, like our President today, had previously served as Assistant Secretary of the Navy, and was therefore both interested in and well informed of its shortcomings and its needs. It was during his administration in the years 1907-1909 that occasion was taken to show our naval power in a globe-girdling cruise of the so-called "battle fleet," in which I had the pleasure to participate as a "snotty midshipman," in one of our newest battleships, -- and very fine ones they were, too, for the period.

The pendulum had begun to swing back somewhat in subsequent years, until the outbreak of the World War led to a feverish and extravagant resumption of building of a Navy which President Wilson in 1916 decreed should be "Second to None " This noteworthy policy was indeed on a fair way to accomplishment, definitely to the displeasure of several foreign naval powers, when the sentiment of a country and a world weary with war, led us into the Washington Limitation Conference of 1921-1922 and subsequently to the London Limitation Conference of 1930, which I had the privilege of attending as a technical advisor to our Ambassador, an ex officio member of the American delegation Leading the way in idealism, to the limitation of armaments by example, we contracted under the Washington Treaty to scrap not only numerous pre-war battleships but many fine new battleships

and battle cruisers of post-war design, - all of them laid down and some in an advanced stage of construction, - a sacrifice far and away beyond anything contributed by any of the other signatory powers. For the next six or seven years we laid down practically nothing but ten light cruisers of the RICHMOND class (excellent for their size and type), which had been excluded from the provisions of the Washington Treaty, applying only to capital ships Similarly, in 1930, when foreign navies had been consistently built up in all types not restricted by the Washington Treaty, while our own Navy had been allowed to languish and become relegated to a position of secondary power (except for battleships), we agreed to limitation of types which had not been included in the Washington Agreement, viz , aircraft carriers, cruisers, destroyers and submarines Like prohibition, it was a 'noble experiment," and like prohibition, it neither prohibited nor did it last

It dawned upon the country during this period that while we were lagging far behind in ship construction, and in our treaty quotas, other signatories to the Limitation Treaties were continuing to build up to the limits permitted them, and commencing in 1924, Congress authorized the construction of a series of eighteen heavy cruisers, followed in 1929 by a program of nine light cruisers, -- both of which types are at least the equals of corresponding types abroad Concurrently a program was authorized of destroyers and submarines to replace the obsolescent vessels of those types built during and before the World War, so that we now have in commission or under construction a fleet of nearly one hundred and fifty vessels of post-war design and construction, half of which are already in commission and the other half scheduled for completion at intervals during the next four years, there of course being no limitation on construction, by international treaty, since December 31, 1936 Our current construction program includes two battleships, each estimated to cost upwards of sixty million dollars, the last unit of eighteen heavy cruisers, and nine light cruisers, each averaging in cost about eleven to twelve million dollars, a total of some seventy-eight destroyers built or building at costs varying from two and one-half to four million dollars, and some thirty-four submarines at a cost of roughly three millions each. We hear reports of a forthcoming program in addition, of five more battleships, two additional plane carriers, two cruisers, twenty-eight destroyers, twelve submarines and additional much needed fleet auxiliaries The impressive total represents an expenditure of close to a billion dollars, of which roughly a third to a half

represents material, requiring rigid inspection to assure its suitability for the very exacting demands of arduous naval service, and to assure that the Government receives a dollar's value for every dollar expended, - whether that dollar be gold, paper or rubber

Human nature being what it is, - all of us possessing in a greater or less degree the instincts of the horse trader and the purveyor of wooden nutmegs, - not to mention the recent discovery of a rapacious class in America known, I believe, as "economic royalists," - there has always been and always will be need for independent inspection of the vast quantities of material required for the construction and maintenance of the Navy, just as for other large industrial and military organizations

The total value of material accepted by the Field Inspection Service of the Navy during each of the past three years has closely approximated one hundred and twenty-five million dollars, representing a tonnage of over half a million per annum, of which some 25% by value and about 20% by tonnage, has been inspected and accepted in the Pittsburgh Inspection District. Recently the value of such material in that District alone, has been running at about three and a quarter million dollars a month

You are all familiar, I believe, with the organization of the Navy Department. However, at the risk of repetition of what previous speakers on naval subjects may have said, I shall refer briefly to the Navy Department's organization in its bearing upon material procurement.

Since the establishment of the present bureau system of administration by the Congress in 1842, the responsibility for funds appropriated for the building and maintenance of the Navy is lodged by statute with various technical, so-called material Bureaus of the Navy Department, including the Bureau of Construction and Repair, the Bureau of Engineering, the Bureau of Ordnance and the Bureau of Aeronautics, each of which is responsible for the determination of the characteristics and quantities of materials required under its cognizance, including the designs and specifications under which those materials are purchased,-- and requisitions for such purchase are initiated by the respective Bureaus having cognizance. The procurement of these materials with certain notable exceptions, including new vessels, public works, armament, ammunition and gun

forgings, is lodged with the purchasing Bureau of the Navy Department, - the Bureau of Supplies and Accounts, - which also has initial cognizance of certain items of material such as food supplies, clothing for enlisted men, and fuel for the Fleet and for Shore Stations. The Bureau of Supplies and Accounts advertises for bids and awards contracts for all material, except as noted, and after the articles have been inspected and delivered, pays for them and handles or stores them until drawn for service. The Bureau of Yards and Docks awards contracts for public works in general, and the Judge Advocate General of the Navy awards contracts for new ships to be built by private builders, and also for lands

Until 1927, the Navy Regulations required that each material Bureau inspect all materials for its own use, but for the past eleven years, the interests of the Bureaus as regards inspection have been pooled, so that material for all Bureaus in any one Inspection District, - with certain noteworthy exceptions referred to hereafter, - is inspected under the Inspector of Naval Material for that District regardless of whether he belongs to the Line of the Construction Corps of the Navy, following the general trend of consolidation of activities in the interests of economy

Material procurement for the Navy falls into three principal categories:

First, the construction of ships by private shipyards, including hulls, propelling machinery, certain auxiliary machinery and installation of armor and armament

Second, materials inspected at the source or place of manufacture, - including items of material or equipment either for use in ships under construction, - both those building in Navy Yards and those building in private shipyards, for use in ships already in service, for the routine maintenance and operation of the Fleet or for stock or use at Shore Stations Frequently this group includes main propelling machinery and important auxiliaries referred to in the first group, when, as in the case of submarines and sometimes for vessels of other types, this machinery is manufactured elsewhere than at the plant of the shipbuilder

Third, a considerable quantity of miscellaneous materials, many of which are more or less definitely standardized and some of which are even of commercial quality, and may or may not require inspection at the

source, but must undergo inspection of one sort or another before acceptance and use by the Navy, whether at a Shore Station or in the Fleet. Included in this group are gasoline, fuel and lubricating oils, prospective bidders' samples of which are tested annually at the Engineering Experiment Station at Annapolis prior to opening of bids and award of annual contract Also in this category are clothing and small stores, provisions, including fresh meats and vegetables, medical supplies, surgical instruments, musical instruments, incandescent lamps, vacuum tubes, etc. Many items in this group, some 500 at present, are covered by the Navy Department's "Acceptable List of Approved Materials," both the composition and merits of which have been demonstrated by tests at a naval laboratory, and thereafter require inspection only for quantity, and periodic comparison with standard samples, so long as they continue to give satisfactory performance in service If subsequent failure on comparative check test indicates deterioration in quality of product, the item is removed from the approved list The manufacturers are naturally very anxious to avoid such a contingency, and make every effort to maintain the high standard of their product, on which inclusion in the Acceptable List was originally based

Notable exceptions to procurement by the Bureau of Supplies and Accounts, as stated above, are certain items of ordnance, - including gun forgings, armor and ammunition, - for whose procurement the Bureau of Ordnance is directly responsible, public works for Shore Stations, including buildings, dry docks, fixed and traveling cranes, and railway equipment, - for whose procurement as well as their design the Bureau of Yards and Docks is directly responsible, and lands, and new vessels, contracts for which are let by the Judge Advocate General

In the main, the three categories or groups of materials, described above as governing procurement, likewise indicate and govern the inspection procedure accorded them

For inspections in the first category named above, - that is, inspection of ships under construction at the seven commercial shipyards now holding contracts with the Navy Department, - the Government maintains offices of a Superintending Constructor, an Inspector of Machinery and an Inspector of Ordnance, who also usually inspect navigational material In addition, where ships were constructed on a "cost plus" basis as during the War, a Naval Cost

batteries and their fire control systems, and also witnesses installation and completion tests including tightness tests of compartments, main and auxiliary machinery tests, etc

It is thus seen that work prosecuted under each technical Bureau is continuously checked and inspected by the staff of Naval Inspectors in the builder's plant from the time the contract for the ship is awarded and the contract plans and specifications received by the contractor, until the vessel is delivered to the Government upon satisfactory completion and commissioning, - and in a measure even until the expiration of the guarantee period for satisfactory operation, usually one year after delivery

Reimbursement to the contractor is usually divided into some forty or fifty equal payments based on the degree of completion of the vessel, and requires certification by the

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Inspector was detailed to each yard to check and audit the company's accounts Under the terms of the Vinson Bill by which shipbuilders are limited to a 10% profit, this function has been revived with reference to private shipyards, the Cost Inspector reporting to the Compensation Board in the Navy Department Inspectors of Machinery and Inspectors of Ordnance are likewise maintained at certain outlying plants manufacturing major units of machinery and armament or armor

The Inspector of Machinery, the Superintending Constructor and the Inspector of Ordnance are the representatives in the building yard of their respective technical Bureaus of the Navy Department, namely, the Bureaus of Engineering, Construction and Repair, and Ordnance, and each is responsible directly to his own Bureau and serves as the intermediary between that Bureau and the contractor on all matters affecting compliance with design, specifications, workmanship, etc.

The first two, the Inspector of Machinery and the Superintending Constructor, having by far the greater volume of inspection work, have each a staff of assistants whose size depends on the amount and magnitude of construction in progress at the shipyard, but usually comprising at least one or two commissioned assistants (officers of the Engineering and Construction branches, respectively), a considerable force of draftsmen (up to a score or more), and a force of civilian special mechanics numbering anywhere from four to a dozen

All detailed plans prepared by the contractor require careful check - for compliance with the Department's contract plans and specifications, - and also the Inspector's approval stamp (or in some cases, reference by him to his Bureau for final approval) before being issued to the shipbuilder's shops The Inspector's drafting force likewise scrutinizes and in some cases initiates, rather elaborate test memoranda to cover shop and installation tests on practically every piece of machinery, all piping and electrical installations, interior fittings, etc , which enter into the construction of the complete ship The staff of civilian special mechanics, usually under the supervision of an officer assistant, follows continuously the fabrication or manufacture, and the installation of practically every part and system entering into the ship, including main, secondary and anti-aircraft

batteries and their fire control systems, and also witnesses installation and completion tests including tightness tests of compartments, main and auxiliary machinery tests, etc

It is thus seen that work prosecuted under each technical Bureau is continuously checked and inspected by the staff of Naval Inspectors in the builder's plant from the time the contract for the ship is awarded and the contract plans and specifications received by the contractor, until the vessel is delivered to the Government upon satisfactory completion and commissioning, - and in a measure even until the expiration of the guarantee period for satisfactory operation, usually one year after delivery

Reimbursement to the contractor is usually divided into some forty or fifty equal payments based on the degree of completion of the vessel, and requires certification by the appropriate Inspector that work has been satisfactorily completed up to this stage and the payment stipulated by the contract has been earned

Usually also, at least one ship of a class is completely weighed (by weighing component items of material) as construction proceeds, and this weighing is a function of the Superintending Constructor's office

For ships built in Navy Yards, the inspection procedure is somewhat less formal and less highly systematized than in private shipyards, for the reason that unlike private shipyards and, I believe, most if not all arsenals, there is no separate and completely independent staff of inspectors, either officer or civilian, except - and this is a very important exception - those officers, warrant officers, chief petty officers and enlisted ratings who are assigned to the vessels under construction, long in advance of their completion and while installation tests and trials are being conducted. The Navy Regulations place upon these officers a definite responsibility for inspection of workmanship and satisfactory compliance with plans and specifications The cooperation between this ship's inspection force and the Yard personnel in charge of construction is necessarily very close Furthermore most of the officers assigned to supervision of construction, have had previous experience afloat, as well as in ship construction, and many of them know that they will later become responsible heads of departments, or possibly even commanding officers of these same ships, and therefore a certain measure of self-interest as well as interest in

the good of the Service, prompts them to take every possible means within their power to see that only the best materials and workmanship go into the vessels building under their supervision From my own personal experience, I feel that I may say that in the inspection and the results accomplished, the Navy Yard-built ships are treated just as conscientiously and just as honestly as the contract-built ships, and they are of course subjected to the same pragmatic test of service.

Upon completion of new vessels, whether built under private contract or at a Navy Yard, and before their entry into service, these ships are subjected to very rigid full power trials, tests and thorough over-all inspection by a permanently constituted Board of Inspection and Survey for Ships, of which one section, for the East Coast, bases on Washington, D C , and one for the West Coast, on Long Beach, California These Final Inspection Boards, if we may so describe them, comprise highly qualified and skilled technical officer members to the number of some ten or twelve, with a Rear Admiral or senior Captain of the Line of the Navy as Senior Member — each member being a specialist in his line, whether engineering, gunnery, naval construction or whatever it may be, and I can assure you that this Board puts each new ship through her paces in a most thorough and exacting manner, before she is permitted to join the Fleet As I shall point out later, naval inspection of ships does not stop even at this point All vessels in service continue to receive thorough over-all inspections by the Board of Inspection and Survey throughout their commissioned life at intervals prescribed by regulations as not in excess of three years, - this in addition to more frequent inspections by the forces afloat.

Passing now for a moment from the first to the third category of inspections, - necessary but possibly relatively less important than the other two, and much less in value of tonnage of material inspected, - this category covers material ordinarily of such standardized character as to require chiefly inspection for quantity at the point of delivery, usually a Navy Yard or Fleet Supply Base. As previously stated, a great many materials in this category are procured from manufacturers who have demonstrated their capacity and integrity and good faith in supplying materials to standard specifications and have been placed by the Navy Department on a so-called "Acceptable List of Approved Materials " Inspection of materials in this category is usually made only for quantity, workmanship

and surface condition. If this inspection has been made at the source, a check inspection for quantity and satisfactory condition on receipt is usually made upon this as well as on other materials by the comparatively small civilian inspection forces at Navy Yards and other Depots where the materials are delivered A guaranty or sworn affidavit is customarily obtained from the contractor stating that the material submitted for inspection is equal to the sample previously submitted to the Naval laboratory for the original acceptance test, on which inclusion in the Acceptable List of Approved Materials was based A representative sample is then selected and forwarded to a laboratory or Depot at which standard samples are maintained, for comparison with approved samples. The comparison tests are usually conducted by the same Naval laboratory which conducted the approval test. A check on material such as lubricating oil and gasoline, delivered on blanket annual contracts, is maintained by periodically conducting check tests on samples forwarded from designated Naval Activities It has occasionally happened that material covered by a contract requiring inspection at the source has been reinspected for condition as well as quantity by the Yard inspection force at point of delivery although not specifically provided for in the contract This has sometimes raised somewhat embarrassing but not insurmountable differences of opinion between field and Yard inspection forces, resulting in what has really proved to be a very healthy inquiry into the reasons for these differences of opinion

In this category also may be included certain special materials which are inspected for the Navy by other branches of the Government, and those inspected by employees of the Navy Department's Inspection Service after delivery, - the former including fresh meats and vegetables inspected by employees of the Bureau of Animal Industry of the Department of Agriculture, and incandescent light globes inspected by the Bureau of Standards of the Department of Commerce. The latter includes dried and tinned provisions, clothing, textiles, garments, mess-gear, and musical instruments inspected chiefly by personnel under the Bureau of Supplies and Accounts, and medical supplies and surgical instruments inspected by representatives of the Bureau of Medicine and Surgery Timber, which is still required by the Navy, although in diminishing quantities, is usually inspected at the source (the mills) although the tendency is to extend the policy of purchase under the specifications and grading rules of the various national lumber associations and to accept it under their excellent inspection systems wherever available, subject usually to check inspection for quantity and condition at the point of delivery

We now return to the second category of inspections, - in which I believe we are chiefly interested this morning, - covered in their entirety by the Field Inspection Service of the Navy Department and applying to a very large quantity of material (large in both tonnage and aggregate value), regardless of whether procured by the purchasing agents of shipbuilders for incorporation in vessels building under contract, or whether initially contracted for by the Bureau of Supplies and Accounts of the Navy Department, - or as in the case of certain special materials indicated above, by the technical material bureaus and offices having specific cognizance of procurement as well as design and determination of requirements.

Of course you are all aware that vast progress has been made in naval design over the past thirty or forty years, - particularly since the World War, when the metallurgical and engineering sciences have contributed so much toward weight reduction imposed by the Washington and London Treaties (in order to secure the maximum efficiency, fighting value and radius of action within minimum displacement), and concurrently, manufacture of materials for naval construction has gone far afield from the seaboard to industrial centers like the Pittsburgh Area, - points often, and in fact usually, remote from building yards, Fleet Supply Bases and Naval Shore Stations It is of course obviously wise and economical to inspect as much of this material as practicable at the point of manufacture, - the source, - and to reject any unsatisfactory material there, instead of after shipment, (frequently over long distances) to the points where the materials are to be assembled and used.

It is this branch of the Naval Inspection Service, the Field Inspection Service, to which I am at present assigned

For the purposes of this Field Inspection Service the continental United States is divided into twelve Inspection Districts based partly on geographical and partly on industrial lines, centering about the most important industrial cities in their respective areas and without particular regard to the boundaries of the fifteen so-called Naval Districts into which the United States and its outlying possessions are divided for purposes of naval, i.e , military administration For example, my own Inspection District extends into four different Naval Districts, but this causes no difficulties of administration such as might be supposed from casual observation The Pittsburgh Inspection District is by far the largest of the twelve in

tonnage and value of material inspected and accepted annually, handling, as I said before, about 25% of the total by value, and about 20% by tonnage In geographical extent or area it lies at about the middle, owing to the fact that certain Inspection Districts in the southeast, southwest and northwest cover very large geographical areas but contain relatively less numerous or less important industrial activities The Pittsburgh District extends roughly from Detroit, Michigan and northwestern Ohio on the west, to Rochester, New York on the east, and from the Great Lakes south to western Maryland, the middle of West Virginia and the Virginia State Line. It comprises a total area of nearly 100,000 square miles.

The cost of field inspection for all Districts now averages from $1 90 to $2.00 per ton of material accepted, or in terms of cost per dollar of value of material, the cost of inspection ranges on the average, from 7 of a cent to 9 of a cent, - that is, the inspection of each dollar's worth of material accepted costs on the average, less than 1% of its value Monthly summaries of inspection costs, both by tonnage and by dollar value, are compiled for each Inspection District by the Inspector of that District, collated in the Navy Department for all Districts, and a summary of costs by Districts disseminated to the various Inspectors of Naval Material, so that they may see themselves on a comparative or competitive basis, - it then becoming a natural point of pride with each Inspector to cut his inspection costs down as low as practicable, in comparison with costs in other Districts, so far as this can be done without sacrifice in quality of inspection And the Inspector worth his salt is usually alert to find points in his inspection procedure in which further economies can be effected.

The twelve Inspection Districts to which I have referred above are designated by the names of their principal industrial centers, as the Boston, Hartford, Schenectady, New York, Bethlehem, Philadelphia, Pittsburgh, Cincinnati, Chicago, Atlanta, San Francisco and Seattle Inspection Districts For purposes of administrative control, they are allocated six to the Bureau of Engineering, five to the Bureau of Construction and Repair, and one to the Bureau of Ordnance, the division of assignments between the first two Bureaus named, being more or less arbitrary, inasmuch as since 1927, as I previously stated, all material procured in a single District comes with few exceptions under the inspection of a single

Inspector of Naval Material regardless of the Bureau under whose specifications and plans the material is procured, i.e , whether Construction and Repair, Engineering, Ordnance, Yards and Docks, etc In other words, the Inspector of Naval Material is the representative within his own Inspection District of all Bureaus of the Navy Department procuring material in that District, with the exception of naval aircraft and certain other materials which I have indicated The Bureau of Aeronautics conducts the inspection of aircraft under construction, due to the fact that this is a relatively new and very highly specialized industry, its inspections are conducted through some thirteen offices of Inspectors of Naval Aircraft, situated seven in the East, three in Ohio, one in Kansas, and two on the Pacific Coast. However, the various Inspectors of Naval Material are also frequently called on to conduct inspections on materials entering into the construction and equipment of Naval aircraft

To keep pace with advances in engineering, naval science and industrial practice, the Navy Department has from time to time found it necessary to add to the facilities of its Inspection Service testing laboratories for various types of material. Such testing laboratories are now maintained in conjunction with the Naval Inspection Service and located at the Navy Yards at New York, Philadelphia, Norfolk and Mare Island, at the Engineering Experiment Station, Annapolis, the Naval Research Laboratory at Bellevue, D C., the Naval Powder Factory at Indianhead, Marylard, and at the office of the Inspector of Naval Material, Pittsburgh District. The Naval Proving Ground at Dahlgren, Virginia, conducts gun-fire tests on armor and projectiles All of these laboratories perform inspection tests on various types of materials and in addition, carry on research and development in connection with the improvement of materials for naval use, in both design and composition, to the end that the Naval Service may keep abreast of the times and be assured of the most efficient and most effective materials for its purposes The Navy Department also for purposes of inspection tests, accepts analyses from accredited commercial laboratories.

The Pittsburgh District may be taken as fairly typical of the larger and more important Inspection Districts, except that it includes chemical and metallurgical laboratories for both routine inspection tests and for research, which the other Districts do not possess, being dependent on the laboratories of adjacent Navy Yards.

The main administrative office of this District is for obvious reasons situated at Pittsburgh as most central to the whole industrial area, and it is actually located in the small town of Munhall across the Monongahela River in an office building closely adjacent to and rented by the Government from the Carnegie-Illinois Steel Corporation, where a considerable amount of structural steel and also armor plate for the Navy is produced. This District as a whole comprises a staff of 7 commissioned officers of the Navy, or about one-eighth of the total number of officers assigned to the Field Inspection Service, 89 civilian inspectors; 20 laboratorians, and a clerical force of 48

The main administrative office at Munhall is staffed by four commissioned officers, some 25 civilian inspectors, 20 laboratorians, and a clerical force of 34 who handle the coordination of reports from the outlying branch offices as well as the local inspection reports, and administrative business of the District Owing to the great geographical extent of the District and the numerous somewhat scattered industrial centers, the Pittsburgh District maintains twenty outlying offices comprising staffs varying from a dozen inspectors with a Resident Inspector in Charge, and a clerical force of three or four, down to a single inspector with no clerical assistance. So-called Branch Offices with fairly large staffs are maintained at Buffalo, Erie, Cleveland and Detroit, and there are Resident Inspectors at sixteen other points, including four rather highly specialized offices, - one at the East Pittsburgh plant of the Westinghouse Company, one at the Winton Engine Corporation in Cleveland, - recently re-christened "General Motors Corporation, Cleveland Diesel Engine Division" - which specializes on diesel engines for submarines, one at the Babcock and Wilcox Company in Barberton, Ohio, which produces large numbers of boilers for the Navy, and one at Vickers Inc. at Detroit - not to be confused with Vickers Limited of London, not in any way connected with the latter, - which produce a considerable number of auxiliaries for the Bureaus of Ordnance and Construction and Repair. The East Pittsburgh Office is staffed by civilians especially qualified in the inspection of electrical equipment, and each of the others has a specially qualified officer assigned as Resident Inspector, under the general supervision of the main or Munhall Office.

I believe that your course includes both lectures and study on the various forms of Naval and other contracts. And I therefore here mention very briefly in passing five rather distinctive clauses peculiar to many Naval contracts.

(1) the "Liquidated Damage Clause" providing for the assessment of a penalty for delay in delivery of material beyond the contract date,

(2) a clause included in every contract or order over $10,000 in value requiring statement of compliance with the provisions of the Vinson Act which prohibits a profit in excess of 10%,

(3) a clause included in all contracts of $10,000 value or over, summarizing requirements of the Walsh-Healy Act prescribing hours, wages and working conditions,

(4) the tax exemption clause which permits manufacturers to claim exemption from Federal excise and State taxes on materials used in the execution of a contract, and

(5) a clause in contracts for secret or confidential material, stipulating a penalty of $10,000 fine or two years' imprisonment or both, for wilfully transmitting or through gross negligence permitting to be transmitted to anyone not entitled to receive it any confidential or secret information entrusted to the contractor, - quoted from the so-called Espionage Act, enacted by the Congress on 15 June 1917, and resembling somewhat the British "Defense of the Realm Act," known popularly throughout England as "Dora "

Now as to the procedure for inspection of materials in the second category - The most common form of Navy contract specifies some definite quantity of specific items of material

After the contractor and the Paymaster General have signed the contract, a copy is forwarded to the requiring activity, and to the Inspection District concerned If the contractor sublets a portion of the work to other manufacturers, he sends copies of his purchase orders on those manufacturers to the Naval Inspector having cognizance of the work being performed under the contract The Inspector distributes these purchase orders to the inspection offices in whose Districts the material ordered is to be

manufactured Either the contract or the purchase order is the Inspector's authority to conduct inspection Inspection is conducted at the place of manufacture unless inspection after delivery is specifically required or unless the value of the material is so small as not to warrant the expense of conducting the inspection at the source. Inspection at source is obviously to the advantage of the manufacturer in point of conservation of transportation costs in case of rejection and to the advantage of contractor and Government in the matter of saving time

Inspection Offices maintain supplies of the leaflet specifications most commonly required in the inspection work of their District Other less frequently used specifications must be obtained from the Bureau of Supplies and Accounts when required This is a function of the Progress Section of the Inspection Office. When personnel conditions permit, an Inspection Office Force is divided into Order, Shipment, Progress, Mail and Stenographic Sections The Order, Shipment ard Progress Sections are most intimately concerned with the orderly handling of the inspection data as it flows from Government activity to contractor or manufacturer and vice versa. Contracts or orders for action of the Inspection Office or for distribution to other offices, go to the Order Section which initiates distribution of inspection notices to the manufacturers, advising them that the office will conduct inspection of the material at the plant and requesting them to give forty-eight hours' advance notice when the material will be ready for inspection. All orders issued by contractors on other manufacturers are endorsed by the Order Section and transmitted to the Inspection Office which will conduct the inspection

All contracts and orders which are not transmitted to another District for inspection are routed to the Shipping Section where the shipping instructions of the contract are scrutinized If shipment is to be made at the Government's expense, routing is requested from the Bureau of Supplies and Accounts for use in preparing the Government bill of lading wher the material is ready for inspection. Bills of lading are prepared by the Shipping Section and forwarded to the manufacturer when required Shipping forms submitted by the manufacturer when material is shipped are completed as regards inspection data and certificate of inspection, and transmitted to the Receiving Activity to permit release of and payment for the material. The inspectors' certificate of acceptance on the shipping form is a prerequisite to payment for the material, the completed shipping form being

combined with the manufacturer's invoice for the material when submitting the latter to the Bureau of Supplies and Accounts or its representative for payment The Shipping Section keeps a running account of shipments made on orders and contracts and marks complete all files on which all material has been shipped. It also scrutinizes and transmits to the Receiving Activity the Advance Inspection Report which is submitted by the assistant inspector upon completion of surface inspection. This report generally anticipates the manufacturer's shipping form and permits release of the material for use even if there is delay in receipt of the completed shipping form

When the Shipping Section has obtained all the information it requires, the contract or order is then routed to the Progress Section where a tickler file is kept on all contracts and orders containing a liquidated damage clause It is the function of this Section to contact the manufacturer two weeks before the material is due for delivery, as a reminder of his obligations, and to help him avoid financial loss to himself and loss of time to the Navy. Thereafter, close contact is maintained with the contractor in regard to progress of manufacture and time of submittal for inspection and shipment Receiving Activities are kept informed of progress by copies of these progress letters.

The actual physical inspection of the material is usually made by a civilian assistant inspector who proceeds to the manufacturer's plant armed with the necessary specifications, plans and a copy of the contract or order The surface inspection is made in accordance with the plans and specifications, physical tests are generally conducted at the contractor's plant, and samples for chemical analysis and other tests are taken and forwarded to a Naval testing laboratory The inspector then submits to the Inspection Office certain forms indicating what material has been inspected and the action taken thereon The manufacturer also is furnished with information concerning the material accepted or rejected in order that he may prepare the necessary shipping forms for transmittal to the Inspection Office.

When material has been shipped and accepted by the Receiving Activity, the function of the Field Inspection Service is at an end. The Receiving Activity of course conducts its own inspection for quantity and condition on receipt Occasionally on this inspection defects are brought to light which should have been found by the field

inspector Sometimes defects not visible on field inspection become apparent later, - for example, cracks in specially treated steel plates - brought out in the pickling process conducted by a shipbuilding company or a Navy Yard The inspection force at a large Navy Yard consists ordinarily of some six to ten civilian inspectors operating under the Manager of the Industrial Department. The Supply Department conducts further inspection on its own account for quantity and condition, when storing materials for future issue Thus we see that all in all, naval material has been very thoroughly inspected by the time it is ready for use

So far, Gentlemen, I have described to you the procedure for naval inspection of materials required for the construction, equipment and operation of the Navy and its vessels I would now like to refer briefly to the inspection methods employed to assure that ships in service are maintained at the proper stardard of material efficiency The very complete routine of inspections conducted by the forces afloat within the various commands has as its aim the establishment and maintenance of a high degree of efficiency of both personnel and material These inspections do not come within the purview of the Naval Inspection Service, as such, but they are a very necessary and important part of the Navy's inspection system. Each naval vessel in service is subjected to a thorough detailed material inspection at least once every three years, the inspection being conducted by the Board of Inspection and Survey for Ships, referred to earlier in my discussion, as constituting a part of the Naval Inspection Service For the purposes of inspection by the Board of Inspection and Survey, the vessel is assigned an overhaul period of about two weeks to permit her crew to open up at least 50% of all machinery installed. Every unit opened is carefully examined by the Board for proper working clearances, indications of wear, and desirability of overhaul, repair or alteration. A detailed report in regard to these features is made by the Board to its immediate superior, the Chief of Naval Operations, with copies to the bureaus concerned, to the vessel's Home Yard, the Forces Afloat and the Commanding Officer. The inspection by the Board of Inspection and Survey is usually, although not invariably, purposely timed to precede a scheduled Navy Yard overhaul by about three to six months In transmitting requests for Navy Yard work to be accomplished during the subsequent overhaul the Commanding Officer must be guided, though not limited, by the Board's recommendations, as approved or modified by the appropriate bureaus of the Navy Department

It is readily apparent that since the function of the Board of Inspection and Survey is to find, and to recommend remedies for defects, the ship's attitude should be, and almost invariably is one of helpful exposure of any difficulties with, or shortcomings of material, and there is no tendency to "cover up" defects in a spirit of fancied self-interest or self-protection.

In recent years routine, periodic inspections of material by the unit commanders afloat as required by Fleet regulations, have been brought into line with the independent and less frequent inspections conducted by the Board of Inspection and Survey. While the recommendations resulting from these inspections by the Forces Afloat do not carry quite the implication of mandatory accomplishment attaching to those of the Board of Inspection and Survey, they do receive very careful attention and disposition

When a naval vessel enters a Navy Yard for overhaul, an inspection system by ship's personnel, operating under the Commanding Officer as Chief Inspector, is set in motion as I have previously indicated. Ship's officers, generally the heads of departments, are designated by the Commanding Officer as inspectors for the work to be performed in their respective departments, and their names are transmitted to the Commandant in order that the Industrial Department, under the Manager, may know whom to contact with regard to details of work undertaken in the various departments.

Each ship's inspector generally delegates certain features of the inspection duties to his subordinates — making use of experienced petty officers as well as commissioned officers to assist him in his inspection as work proceeds Every item of work is carefully followed by these inspectors from the time material is placed in production in the shops of the Yard, to which they have free access, until installation and tests are completed The basic materials, of course, come usually from Navy Yard stock which has all been through the inspection routine I have described before as the field function of the Naval Inspection Service. The finished job is accepted when the ship's inspectors are satisfied with the material and workmanship, and invariably after a test for conformity with designed requirements.

Upon completion of Yard overhaul, or any extended period of laying up, the ship's personnel, assisted as necessary, by the Yard force, conducts a dock trial of her main propulsive

machinery, which consists of driving the main engines ahead, then astern, very slowly, while the vessel is secured to the dock This provides for a pressure test of all piping and working parts and serves to bring to light any improperly sealed joints or slight maladjustments of machinery

If any extensive repairs or alterations have been made on the main engines themselves (such as a turbine overhaul), a post repair trial is conducted in addition to the dock trial noted above On the post repair trial the vessel proceeds from the Yard to an area where she may work up to full speed The run continues until the Commanding Officer is assured that everything is satisfactory - or until defects appear Development of any defects in work for which the Navy Yard is responsible, usually requires immediate return of the vessel to the Navy Yard Such is happily of infrequent occurrence If everything is satisfactory, the vessel proceeds to sea after disembarking the Navy Yard representatives who have been on board during the trial. Great and increasing importance is attached to these post repair trials, and it is by no means infrequent that the Manager of the Navy Yard proceeds on the trials, accompanied by a staff of well qualified officer and civilian assistants who are well informed of the work which has been done on the various installations for which they have been responsible during overhaul

I should like, before closing, to refer briefly to one point which is almost a hobby with me in the administration of my Inspection District

It concerns the relations between the Government Inspection Service and contractors Among all of my assistants, I insist upon a scrupulous regard and consideration not only for the contractual rights of the contractor, but for his feelings and probable reactions as a human being, - realizing that the best business relations can be maintained only where there is a mutual feeling of respect and liking, and mutual confidence as to good intent and good faith I think that in the mechanism of government - government officialdom and red tape, if you like, - some of us are prone to overlook or forget the human factor and to presume upon what we might call the Goverrment's right of eminent domain

As a corollary, I try to impress upon my inspectors the necessity for avoiding an arbitrary or unreasonable or "high hat" attitude. This impulse, as you all know, is very strong in some individuals vested with a certain

authority, who believe themselves also to have unlimited Government backing.

And here I desire to pay a tribute to what I believe in the main to be the very high caliber of our civilian inspection force, - all of whom are obtained through examination and certification by the Civil Service Commission, - as regards integrity - (that must always come first) - experience, ability, conscientious application to their jobs, devotion to the Government's interests, and adaptability They are not as a group, highly paid, and I believe that in the main they do an excellent job. Among them we find all varieties of training and experience, including college trained Bachelors of Science, electrical experts, mechanics, former railway inspectors, timber experts, etc. But regardless of training, a sound knowledge of psychology and of human nature is after all one of the prime requisites of a good inspector as it is of a good officer or a good man in any walk of life Bad psychology and lack of tact in an inspector can do the Government almost as much harm in its procurement relations as ignorance or stupidity

In conclusion it is desirable to consider briefly the adaptability of the Naval Inspection Service, as at present organized, for expansion to a war-time basis. Such an expansion, involving the recruitment of the required large number of additional civilian inspectors, and their indoctrination in Naval requirements and procedure, will not prove a simple matter, particularly in view of competing demands for inspectors in other Government Departments and for experienced mechanics in Navy Yards, private shipyards and among munition manufacturers of all sorts. However, many men are available throughout the country whose age or some physical disability renders them unsuitable for enlistment in the armed forces, but whose experience and integrity make them generally suitable for inspection work. It remains to determine the priority of claim for inspection over production It would also probably be necessary, as was the case in the World War, to replace many of the officers now assigned to inspection duty, with retired officers and those available and qualified for such duty among the officers of the Reserve.

In this connection, one great difference which exists between the procurement problem of the Army and that of the Navy, involving a radical difference in magnitude and scope, if not in character of peace time inspection, is that the Navy comprises not only a substantial "Fleet in Being," with

all its auxiliary services and shore-based supports, but also at present at least a large and active program of New Construction, - which it is true would be greatly expanded on threat of war, - so that except for such expansion, and maintenance of the fleet on a war basis, the procurement problem of the Navy in war time would not be so greatly different from that which confronts us already, in peace time. Therefore, our problems of expansion to suit war conditions, while unquestionably considerable, would probably be nowhere near so great as those which would confront you of the Army. In other words, the transition from a peace to a war footing is possibly less difficult for the Navy than for the Army owing to the fact that the upbuilding and maintenance of the fleet and the naval establishment in time of peace engages the same general types of manufacture as would be required in war, the chief difference being in the expansion required to meet greatly increased quantity, but not change in character, of output

Thank you.

Discussion Following Lecture
"The Navy Inspection System"
by
Captain R. T. Hanson, U.S.N.

The Army Industrial College
January 11, 1938

Colonel Jordan: Gentlemen, Captain Hanson told you about the "iron bull" story. (general laughter). I propose to let you all in on the whole story - some of you may not know about it. Captain Hanson spoke before the Organized Reserve Ordnance Officers in Pittsburgh, and in his speech he used the same phraseology that he used this morning in a part of his talk. He said: "After Appomattox, however, the Navy was again allowed to slump until it reached an almost unprecedented low during the 1870s, over a period in which our merchant fleet of clipper ships had reached its peak of distinction, and then likewise began to decline, owing to the advent of steam propulsion, iron 'bulls', and the opening of the Suez Canal." The young lady in Major Minton's office struck a "b" on her typewriter, in place of an "h" - he meant iron hulls. However, that is not the joke and the joke is not altogether on Captain Hanson. I nominate another gentleman for the "Order of the Iron Bull," profound in Captain Hanson's prefatory remarks. As you know, the Navy has secrets, and they try their best to keep from us of the Army many things which we want to know about. (laughter). They have phrases which they spring on us at all kinds of odd moments. They never "go" anywhere, they "shove off"; and they "get fleeted up" instead of being advanced or promoted. When this "iron bull" appeared in the speech of

the Captain's, I selected a distinguished Naval Commander on the faculty and asked him please to let me know what the Navy meant by "iron bulls," that I did not understand it. He took the speech and I understand he telephoned a great number of people over in the Navy Department. Then he came into me and said: "Colonel, I have not gotten to the bottom of this yet. I do not know what an 'iron bull' is." I say that it is up to us when we go out to Pittsburgh to have an "Iron Bull" decoration for Captain Hanson; and if we take this distinguished Naval member of the faculty along, that we give him an "Iron Bull" also.

Captain Hanson has agreed to answer any questions which we may propound to him, and I would like to hear from the student body. Do not be bashful because he is ready to answer your questions.

Q.1. Is the Navy inspection service charged with peace-time procurement planning in any way?

A. Only immediately. ~~They~~ It does ~~do~~ not initiate procurement planning. That is initiated in the Department, but advantage is taken of ~~their~~ its presumptive superior intelligence and ~~their~~ its knowledge of the details of procurement problems to contribute to that procurement planning.

Q.2. Is there very much of that work, Captain?

A. Not a great deal in the past. It is now increasing, has increased very materially in the past six months. Activity might now be said to be getting almost feverish in that respect, for more or less obvious reasons.

Q.3. You spoke, sir, about there being two battleships laid down now, at least under way; and the possibility of laying down five more. These sixteen-inch-gun ships cost us, as I recall, in about 1918-1920, that is the three: the Colorado, the Maryland, and the West Virginia, about thirty-four millions each. These ships, which will be smaller perhaps in tonnage -- (Interruption for correction of statement)

A. Slightly larger.

Q.4. In tonnage?

A. Yes.

Q -- are going to cost sixty millions, an increase of eighty per cent. Has material gone up that much?

A. Yes, very definitely; cost of ship construction has gone up in part on account of the metallurgical processes involved, and in part on account of superiority of design. They will be very much superior ships, I believe, and there is the necessity, as I indicated in my talk, of packing into that limited displacement of 35,000 tons, which is a little bit in excess of the Colorado's tonnage, very much more in the way of fire control, engineering improvements, etc., (in spite of the developments which would appear to operate the other way in weight saving) and in other measures to secure increase in efficiency of operation and steaming radius. Great importance will be attached to steaming radius, ammunition supply; and very greatly increased importance to defense against anti-aircraft attack as well as mines and torpedoes. The increased cost is definitely due to increased cost of materials, increase in wages, etc., and other factors created by the Naval Holiday, also a combination of great improvements as well as greater complexity in design (III) as with lightning-like rapidity about an eighty per cent increase in cost is easily

justified on those scores.

Q.5. I would like to ask whether the larger ship of the tonnage you mentioned could be passed through the Panama Canal?

A. As you know, the beam of a ship is now limited to something under 110 feet (the width of the Canal locks) I think we have limited ourselves to something like 107 feet 6 inches (or 108 feet) and they occasionally scrape the barnacles off the sides in going through (even then). I have no doubt that our designers would be able to obtain the necessary high displacement - and in fact they did in the [Massachusetts] design, (we will call it that), of the scrapped battleships - and still permit passage through the Canal. Those ships would be of particular value to us in the Pacific. If our activities could be confined to the Atlantic, or if the strategists agreed that we could maintain separate forces in the Atlantic and Pacific, which I do not believe they ever would agree to, then we could accept the smaller tonnage for Atlantic forces and go to the increased tonnage for the Pacific forces But, in any event even the latter would undoubtedly be adapted to the characteristics of the Panama Canal

Q.6. Captain, would you mind extending the remark you made about the influence of British naval policy on our construction ideas; and also how closely do we keep in contact with foreign developments in Navy construction?

A. Very closely, ~~as far as the very close-mouthed foreign~~ designers will permit. It is the function of the technical assistants naval attaches abroad to try ~~and~~ to worm out of them everything that they can in regard to the developments of design. On

Please omit from here to end of line 4, top of page 6. "get off the record." RHM

Q.7. What latitude, if any, is allowed Inspectors of the Naval Inspection Service in the interpretation of specifications?

A. The same latitude as assumed by the Inspector of a Naval Inspection District (not, however, by the individual assistant inspector - at least only to a limited degree) that any good General or officer in military command or responsibility, exercises: if his judgment is sound and if he is successful in the exercise of the latitude he is a great man, if it turns out that his judgment was bad or the thing fails in service then he is rotten and he gets properly "panned" for failing to refer the matter to the judgment of superiors at headquarters. It is a matter of very fine judgment as to what latitude the individual shall exercise. It is not laid down specifically, and I think it is much better not laid down. If the fellow is any good at all he will exercise his best judgment on the matter. If he thinks that he is not fully qualified to pass sole and independent judgment, and a good man knows what his limitations are, he may decide the matter and inform the people higher up. That happens to be one favorite device of mine - to go ahead and make a decision and tell the people higher up I have decided accordingly. All of you who have had bureau experience know that in nine cases out of ten the people in the bureau are delighted to have somebody in the field make the decision and tell them he has done it, because if there is not a very sound and strong

page 5 deleted at Mg. Capt. Hanson 2/17/38

reason for disapproving his action it will not be disapproved; and then they can simply put it in the usual, or circular, files and let nature take its course. In brief, there is a good deal of latitude exercised in the field except on highly technical matters, with regard particularly to armament, armor, (propulsive equipment), that sort of highly technical matters.

Q.8. Captain Hanson, you spoke about contracts. Do you contemplate the use in any future procurement program of "cost-plus" contracts?

A. I hope not. I think that that was mutually distasteful to the contractor and the Government. Of course you are familiar with the two types of "cost-plus" contracts: one, cost plus a fixed profit; and one, cost plus a percentage The Vinson Bill has taken care of the percentage by restricting it to not over ten per cent. Of course he would be a brave man who would prognosticate what, particularly in the present attitude toward business in general, the Government might decide to do in the way of adopting a "cost-plus" contract, but I think that, as I said, both the people immediately responsible under the Government and the contractors would rather keep clear of that form of contract. It was not popular and so far as I am aware it has not been resorted to of late except under the terms of the Vinson Bill, which is itself an automatic "cost-plus and percentage" contract.

Q.9. Captain Hanson, has the current procurement of the Navy been affected materially by the exercise of authority of the Director of Procurement, Treasury Division, under statutory enactment, giving

them authority - ?

A. I should say not very extensively nor seriously so far as ~~that~~ has been developed to date It has had this indirect reaction: along with a number of other influences, it has influenced perspective bidders and contractors considerably. The attempt to "take profit out of war" and the imposition of very drastic rules and regulations about conditions of work~~manship~~ under the Walsh-Healy Act, all those things have made manufacturers "cagey," and I think properly so. Another feature of passing interest which has developed, and it is in line with the general tendency, is the resentment which is growing among contractors over the fact that taking advantage of purely legalistic ~~statutes~~ rights i.e., implied contractual right, the Government will take the results of research of a manufacturer when not fully covered by patent rights, and in the interest of speedy material procurement in an emergency, and of improved design, disseminate that information to what may very readily become competitors of that manufacturer. At the present writing my sympathies are very strongly with the manufacturer in that respect. I would prefer to see his ethical rights observed, rather than see the Government take advantage of its legal rights; but on the other hand, the national defense will be greatly advantaged by dissemination of what we may call almost "trade secrets." However, there is no question that it is stirring up resentment among manufacturers. You can see, among the little manufacturers particularly, a fear of refusing anything that the Government asks, but they prefer to make a

trip down to Washington and deliver the information by word of mouth in the hope that at the same time they can use enough persuasive eloquence to dissuade the Government representative or bureau from giving out their trade secret to a possible competitor.

Q.10. Captain, there is a system in the Navy whereby the manufacturer may submit an article or an item to the Navy Department at his own expense for test, performance test probably -

A. That is correct.

Q.11. If that is approved the particular article is placed on, shall we call it, the approved list -

A. "~~Approved~~ Acceptable List of ~~Acceptable~~ Approved Materials."

Q.12. Can you tell us something about that system and its advantages?

A. Can you phrase the question a little more in detail as to what phase of the system you want information on? If I may go on for just a minute first, a manufacturer thinks that he has a superior product. It may involve trade secrets or it may be simply based on his research development along lines other manufacturers have likewise pursued but not so successfully, in his opinion He simply brings it down, ordinarily first to the technical bureau concerned; or it may possibly go to the office of Technical Developments in the Office of the Chief of Naval Operations. If ~~they~~ the proposed item has any smell of being crack-brained or "phony" ~~they~~ it is ~~are~~ dumped into a convenient receptacle of the office of Technical Development, which probably in the last analysis will turn ~~them~~ it over anyway to the technical bureau qualified to pass on ~~them~~ it If a

manufacturer can demonstrate to the technical bureau that he has a superior article, that bureau then makes appropriate recommendation to the Bureau of Supplies and Accounts and in agreement between them they incorporate this article into the ~~Approved~~ "Acceptable" List of ~~Acceptable~~ approved Materials." However, it must first have been tested out very exhaustively at a testing laboratory, such as the Engineering Experiment Station, ~~other than the~~ Navy Yard ~~here~~ or the one we have up at Pittsburgh; and it is subjected to recurrent check tests, as I told you, later on. That, in a very general way, is the procedure followed for getting an item into the ~~Approved~~ "acceptable" List of ~~Acceptable~~ approved Materials." If you have some other detail --

Q. I had in mind the articles of more or less general use, particularly for the Bureau of Engineering, e.g., safety valves. You have an approved list of safety valve manufacturers?

A. Yes. I can not tell you specifically and definitely, without fear of question, that this approved list of five hundred items includes safety valves, but to all intents and purposes we have safety valves of various standard makes on an approved list whether it is on that formal list or not. Those that ~~have secured~~ desire admittance to that list must usually pass an experimental service test, possibly in some ship in the fleet, after laboratory tests. However, the test is very exhaustive. After going through the laboratory test, ordinarily it is sent out to a Navy Yard with instructions to the commandant and through him to the manager and the commanding officer of the ship that it is an experimental installation requiring reports at recurrent intervals based on the time required

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to demonstrate its satisfactory functioning. The contractor or the manufacturer who is interested in it also is permitted to send his technical representatives to witness or assist in or make the installation on board the ship; and by permission of the Bureau of Navigation of the Navy Department, he is some times permitted to send a representative to sea with that particular ship to witness the operation of the device in service.

Q.M. You mentioned the question of Naval expansion of the procurement service in event of emergency, and of course the Army expansion. If they are not Navy secrets, I have two questions. One, what are the methods by means of which you will select the personnel? Is that laid down by rules or can you, if you are in the Pittsburgh District at that time, go out and commission and select?

A. At present it is very definitely laid down as a requirement for conformity with Civil Service Regulations, so far as concerns civil employees. We are obliged by the present regulations to take only employees certified through the Civil Service Commission or by transfer reinstatement, et ~~and reinstatement~~ from another department of the Government, all subject to the approval of the Civil Service Commission As a matter of fact, recently we have taken a number of men from the Army Engineer Department for whom there was no work, due to reduced appropriations for engineering work. I suspect that in emergency (some times it does not require a very serious threat of emergency) the Civil Service bars might be let down in certain directions. In that case we would grab any good man we could get, and I may say in this connection that

even now, when there is no very serious emergency threatening, I receive a great many applications from civilians who have lost employment through reduction in force for one reason or another during the economic recession. I have given them usually a personal interview. I am very strong for the personal interview business. I once had a hard-bitten old chief clerk who told me I was making a great mistake in trying to judge the capacity of a man by his "phiz," but I still think that a ten minute conversation with a man, and a look at his face and his general bearing gives one some inkling, at least more than graded Civil Service papers, as to whether he is going to be any good or not - on the psychological side, what I spoke of as the <u>human</u> side. I think in an emergency that probably the Civil Service bars would be let down a great deal and that we would be able to recruit a great many men· some from Navy Yard mechanics, some from mechanics in industrial concerns, and others who have been unable to get employment on account of age. As you know, in spite of what "Esso" tells us every day at noon over the radio, it is very difficult now for a man fifty ~~and~~ ok over to get reemployment I confess myself to hesitating to take on a man over fifty where a man who looks equally ~~as~~ good at thirty or thirty-five, applies for the job.

Q.15 What about commissioned personnel? There is a reason for that question; I am not trying to pry into Navy secrets at all. I wonder if you set up a list of proposed Reserve commissioned personnel that you might require in the event of an emergency, and if you have such a list whether you have checked that list with the

Army or with various procurement offices up there so all of you are not asking for the same personnel?

A. We have such a list of qualified reserves in the Navy. Some are already entered and enrolled as reserve officers. I should say, however, no where near as extensive as your reserve lists in the Army. So far as I am aware, I think I am correct in saying that there has been up to date no effort to check between the two (Army & Navy); except that when a man makes application for enrollment or is spotted as a likely man for enrollment he states whether or not he is already enrolled; and if he is enrolled in one of the Army Reserve Corps we naturally will not take him for the Naval Reserve unless there are some special qualifications, in which case as far as I would have anything to do with it, I would have the matter referred to the proper branch of the War Department to see whether they would "yield the point", so to speak, to our prior claim on his qualifications. We have, incidentally, in the Pittsburgh District two organizations, one of ex- and retired enlisted personnel, quite active; and one of organized Naval reserves also fairly active, both of which are under the continuous scrutiny of the officer in charge of the local recruiting office there, who keeps in touch with them

Q. I would like to ask, Captain, how much work for other Government departments do you do in the Pittsburgh District? Do our various Government departments duplicate the Navy organization in Pittsburgh to a great extent?

A. No, I should say there is not very extensive duplication.

I have not analyzed the figures but I would say on a semi-intelligent estimate that our work for other departments of the Government runs up to between five and ten per cent of our total inspection load. (That is, by percentage cost of inspection; it is considerably less by value of material accepted.) Of that some is for the Department of Agriculture, some for these various alphabetical organizations. I have in mind one contract that we inspected for the Boulder Dam, which unfortunately resulted in some rather heated controversy on account of allegations that were made as to our inspection of castings, which I may say had been rottenly designed; castings that were one integral piece about twenty to twenty-five feet in diameter and about fifteen feet high, to take the impact of water through a penstock out at Boulder Dam, or some similar problem. We have, I am happy to say, been able to cooperate with the War Department on inspections, particularly at the Carnegie-Illinois Steel Company, and with the Picatinny Arsenal in the inspection of aerial bombs. It is scarcely necessary for me to state, I think, that Major Minton and I are in very close touch with each other, and I can not pay too high a tribute to his friendly cooperation and anxiety to make available to me every bit of information useful to the Navy Department, which that he has acquired ~~himself~~ in his job, which perhaps requires somewhat less routine "run of the mine" administration than mine, on account of the difference in number of personnel supervised. Of course a part of my job ~~is connected with~~ involves administrative details of handling some 150 to 200 different individuals, as well as the purely technical side; and we have cooperated, I should say, a hundred per cent. I know that his cooperation with me has been a hundred per cent; I hope mine toward him has been approximately that. We have also conducted inspections

for the Air Service and the Ordnance Department when requested. It may be of interest to some of you later on, when you go out from the College with your diplomas in your hand and go to various arsenals, to have the assurance that it takes practically nothing more than a request from the commanding officer of the arsenal where you may be situated, or whatever branch or office you may be in, for us to put your request for inspection right through. We strain ourselves to make our inspection personnel available to all hands. The cost of inspection to the other departments of the Government, while perhaps a little more than nominal is only the cost of the actual inspector's time. None of the overhead enters into it when the inspection is conducted for the other branches of the Government. It is assumed that they are willing to pay for the actual cost of inspection, which they usually do without question.

Q.17. Many of the labor agreements made during the past year will run out shortly. Would you care to say a word about the management of the labor relationships in the Pittsburgh District?

A. I think it would be a little inappropriate for me to express my opinion on that, if you do not mind. It is a very delicate subject, as you know, a highly inflammable one; an already considerably inflamed one. It happens that the Carnegie-Illinois Company, where our office is situated, is a part of the United States Steel Corporation, which was the first to enter into agreements with the C.I.O. However, I would rather not talk in any detail or at length on that subject.

Q.18. I would like to ask a question with respect to what occurs when you accept bids for articles on this approved list of

suitable materials. Do I understand that acceptances are restricted to bidders who are on that list?

A. I should say not. Commander Dunham may check me up on that point, but I believe that other bidders are by no means eliminated. However, they have to demonstrate suitability and adequacy of their product.

Q. If time does not permit, I was wondering whether they still would be excluded. It occurred to me that possibly the Navy had some special authority or better system that enabled them to exclude the unknown or undesirable bidders, which I had the impression bothered the Army purchasing officers some times.

A. I believe in that respect the practice is to specify in the requisition that the material "shall be the equal of" (that is a common phraseology), and then name something that is on the approved list. It is up to a bidder not on that list to demonstrate that his product is "the equal of". It may involve some time and some expenditure in our laboratories, usually at his expense, to demonstrate that it is the equal of an item already on the approved list.

Colonel Jordan: I have some information here that may help in answer to your question, which comes from the Navy. It contains a clause which reads like this: "The right is reserved to reject bids on (whatever the material may be), which have not been subjected to the required tests and found satisfactory. The attention of the manufacturers is called to this requirement and they are urged to forward samples

of the articles they propose to offer the Navy in the future in order that tests may be made." In other words, the Bureau of Supplies and Accounts has no hesitancy in striking off the list any manufacturer who has not at a prior time submitted an article for test, and that test is made at the expense of the manufacturer. I happened to look that up yesterday because I was sure the class was going to ask it - I I just felt it - and I wanted to be able to back Captain Hanson up on it.

Captain Hanson In extension of the Colonel's remarks, I may call attention to a "device," - we may call it, - a perfectly ethical device by which all bids can be rejected and the schedule readvertised. I believe the department reserves the right always to reject all bids and to readvertise the schedule, in the hope or with the intent possibly even sometimes, of getting somebody who has not gotten in on the previous bids.

Q.20 With further reference to this accepted schedule, I am beginning to get curious about it. Once a manufacturer has submitted his sample, whatever it may be, naturally the item does not stay put, they are always improving it, at least they think they are improving it. When an item is improved, is there any requirement that it must be submitted before he can bid on a future contract, or is it just taken for granted that if his article was good at one time it will always be good?

A. I should say in regard to that that if it becomes known that there are modifications presumably with the view of improvement of that article, naturally when laid along side the standard sample

it would show ~~any~~ deviations. In that case, it would have to be resubmitted for test, check test, and reapproval to demonstrate that what ~~they~~ were claimed as improvements, were actually improvements over the sample originally submitted. In other words, the Navy Department does not accept ~~his~~ a manufacturer's mere statement that the changes that he has incorporated result in improvement. That must be redemonstrated, first by laboratory test, and ~~possibly~~ then probably by service test, or experimental installation on board ship.

Q. 21. Captain, did I understand that the cost inspectors in your district are under your office?

A. They are not. As a matter of fact, I have no cost inspectors in my district. We are, of course, not concerned with the inspection of ships under construction. The cost inspectors report directly to the Compensation Board in the Navy Department, which I presume, in turn, although I am not specifically informed on this point, ~~are~~ is in close touch with the Treasury Department, on ~~whom~~ which lies the requirement for enforcement of the provisions of the Vinson Bill that profit shall not exceed ten per cent.

Q. 22. I am curious as to whether a shipbuilding concern that has corporate interests in its suppliers, or in what was consolidated on down the line, has a total, or overall limit on the profit it can make, or if it can take a profit in each step?

A. I am not well informed on that point but I should say that interrelated or interlocking corporations are regarded as separate entities.

Q.23. I should imagine so.

A. (continued) And that the shipbuilder is concerned only with the profits in the actual building of the ship. If he happens to own a steel mill or an electrical manufacturing plant, that is regarded as a purely separate proposition and the profit there can not exceed ten per cent, but they are regarded as separate and distinct corporations for purposes of administration of that law.

Q.25. In that event, would there be any criticism by the Treasury Department of a man buying from himself?

A. So far, I suspect they have not thought of sleuthing down that channel, or if they have thought of it they have not adopted it yet. However, there is no telling what we may come to.

Q.24. I should think that they would have to prove that they did not pay a higher price than it could be gotten for from some one else.

A. That is not the concern of the Government We will take the matter of a ship, for instance, as the best concrete example. The shipbuilder bids a certain price on the ship; the Government technically, I think, does not care a continental how or where he gets that material or what he pays for it so long as it conforms to the specifications, plans, and the design, tests out satisfactorily, and does not represent a profit in excess of ten per cent on the finished ship.

Q.25. If he paid higher for his supplies he could keep the ten per cent.

A. I believe that I am correct in saying that the Government does not scrutinize or exercise any supervision over sources of procurement of the shipbuilder except from foreign sources. You understand that we are restricted to the use of domestically manufactured products unless some very cogent reason can be shown that there is no such product obtainable in this country

Q. 26. Captain Hanson, as we understand it, when under the Merchant Marine Act of 1936, a private steamship company builds a tanker, let us say, and increases the size, strength, or other military characteristics of that type to take care of a possible future need and to allow the vessel to become an auxiliary for the Navy, certain additional funds are granted as a subsidy for that purpose by the Navy Department

A. Right.

Q. 27. What system of inspection does the Navy Department maintain on the actual performance of that work?

A. Initially the plans are scrutinized by the war plans section of each technical design bureau to see that the structure and general design are in conformity with certain standardized requirements for Naval auxiliary purposes. Concerning the inspection at the builder's yard, I believe although I am not definitely informed on this point, that the Government will accept the inspection of a standard classification society, the American Bureau of Shipping, Lloyds, etc. In other words, having determined the requirements and incorporated in the design certain points in regard to speed, cargo, capacity, gun foundations, etc., I believe that up to the present writing the Government

accepts ~~a standard~~ by a standard inspection agency (classification society) inspection as to conformity with that. So far they have not considered it necessary to designate Government inspectors for that purpose except where an inspection system of the Navy is already set up at certain of the principal shipbuilding plants, and even in those cases I am not sure whether the Government inspector is charged with any responsibility for checking on that merchant construction or not. That may come later It certainly will come if it should develop on any of the early products of that Act that there was any skimping of the requirements, but I do not believe that it is considered necessary now and I personally do not see that it should be necessary. We accept that just as we do the standard inspection organizations for timber; we accept the good faith and qualifications of certain reputable standard~~ed~~ inspection organizations for ship registry.

Q.28. Will the actual military features of the drawings for that vessel be inaugurated in the Navy Department or put in by the original designer?

A. They are put in by the designer to what we may call general plans and specifications furnished by the Navy Department. Every man who holds such a contract is furnished with these standard~~ed~~ requirements and is also in frequent touch by personal interview with the design divisions of the various bureaus in order to clarify his ideas as to what is actually required, if that is necessary over and above the plans and specifications.

Q.29. I would like to ask as to what extent the Inspection District is concerned with production control? I presume that on the

contracts for materials for a ship, e.g., that the contract would state the quantities and times that specific items would be delivered. Are you required to follow that up, and can you do anything?

A. We do follow it up, and aside from the "liquidated damage" clause, we have only the power of moral suasion and pressure on the contractor by somewhat indirect, informal means to speed up production. We have no formal and specific control over his production. Each manufacturer, particularly the reputable ones, understands, however, that in order to secure favorable consideration on future bids he must demonstrate good faith in meeting the terms of his contract as to rate of output. Of course, one very strong factor which interfered with production in the Pittsburgh area in the spring of 1936 was the famous St. Patrick's Day flood. The Westinghouse Company's plant at East Pittsburgh, for instance, was submerged to a depth of some seven feet over the main shop floor. The Navy Department, and all departments of the Government, I think, in varying degrees, have some bowels of compassion about what constitutes an "act of God" - not quite as liberal as is sometimes attempted on the stage, but still they do recognize that there are definite acts of God which interfere with the contractor's meeting the letter of his contract in rate of output and delivery. However, the only power that we can exercise is one of moral suasion, "shaking first the fist and then the finger" - so to speak, - at what is going to happen to him the next time he bids. I can of course recommend that a man be removed from the list of acceptable bidders, and some weight would be given to that in the Department, on future bids.

Q. I presume that you inspect and accept material at point

of origin before it is delivered to the point of use; and ultimately the material has been determined defective?

A. We have such cases.

Q. So I imagine. Do you have a cut and dried policy, or a general policy? Would you mind explaining that?

A. I think I may say that usually there is a clause in the contract stipulating inspection at the point of origin. Under the strict letter of a contract the Government is then obliged to accept that material at point of delivery except for certain modifying clauses in the general inspection requirements to the effect that damage in transit or shortage in quantity on delivery are sufficient to warrant rejection; as is likewise proven intent to defraud the government. It involves a rather fine point where there is obviously no damage in transit and no shortage on delivery. The embarrassing question arises between the judgment of the inspector at the source and that of the inspector at the yard. It results in very acrimonious charges on the part of the contractor, and rather heated, sometimes controversial, correspondence between the field inspector who accepted the alleged defective material, the bureau of the Navy Department which is faced with the necessity for backing up one inspector or the other, and the commandant or the supply officer of the yard who received the material. There again the human factor enters in very largely, certainly in my case. I have no false sense of pride about "acknowledging the corn" where one of my inspectors has let me down, particularly as in one recent case where photographic evidence was produced that the material on receipt at point of delivery was rotten, at least superficially and as far as the

photographs could penetrate - they were candid camera photographs, and not gamma ray photographs. In such a case the Government can usually persuade the contractor that even though the inspector at the source accepted the materials, it is obvious that if he wants to continue to get Government contracts he will not insist on his pound of flesh, or the letter of the contract which stipulated acceptance at the source.

Colonel Jordan. Captain Williams, we would like very much to hear from you, sir. Won't you please say something to us?

Captain Williams. I think I have Captain Hanson sort of on the spot on the question of cost inspection. The contracts for the ships provide that the contractor, (shipbuilder), can make more than ten per cent but there are also provisions that some contractors can not make more than ten per cent, for contracts in excess of $10,000.00. The Government is protected in that way. In other words, any sub-contractor who takes a contract for new ship construction in excess of $10,000.00 and makes more than ten per cent on that is obliged to return the excess to the Treasury Department (Bureau of Internal Revenue). Concerning the question of "cost-plus" contracts that came up, I think that those who were around in 1916 will recognize an almost exact similarity to the situation that existed then, when "cost-plus" contracts first started. In other words, the Navy was about to embark on a considerable shipbuilding program. No shipbuilder could take a contract with any assurance of what his cost would be - material cost was going up, labor costs were uncertain. At that time they went by the "cost-plus" contract, which was so unpopular and I would say unsuccessful. Now we make our ship

contracts under the Vinson Act, which requires the contractor to return any profit in excess of ten per cent. We also have a provision which provides for change in the contract price, the amount paid, if there is a variation in wages and material cost as shown by the index from the Department of Labor In other words, if there is considerable increase in labor, which there has been, the contractor gets additional compensation. My own personal opinion is that we have almost got to come to some sort of "cost-plus" contract for the new ships. When the bid~~s~~ ~~was~~ were opened recently for battleships, the private contractors' bids were about ten million dollars in excess of a fair estimate of the cost of those ships As a result of that, both of them were awarded to Navy Yards to construct, although the Navy Department would much have preferred to give one to a private contractor. We are about to build some more battleships, the Navy yards are filled up with battle- and other ship construction, and it remains to be seen how ~~they~~ we are going to get those ~~two~~ additional battleships built, whether ~~they~~ we can get private ship-builders to bid anywhere within reach except on some "cost-plus" basis of remuneration That is my own private opinion - it does not represent the opinion of the Naval Organization. In any event, I think you might all just as well be prepared for some form of "cost-plus" contract, just what form it will take I do not know.

I am on the other end of Captain Hanson's work. With respect to the question about rejection of material which has been found to be defective at the point of delivery, the contracts are rather clear that the Navy has to stand by its inspection at the source unless there is a question

of fraud. We have such cases coming up continually and the Navy Department insists on the contractor's rights in that matter. If the contractor wishes of his own volition or of his own initiative to replace defective material, that is very fine of him but he does not have to do it. That is the truth of the matter.

With reference to the question about approved lists, I think one of the simplest examples of the approved list and how it works is the case of what we call motorboat varnish Varnish is one of the most difficult things to buy, it is practically impossible to buy it on specification. Ship people require a very high quality of varnish for their boats with the idea that the smartness of the boat reflects the efficiency of the ship. I guess that is true. However, we have found that the ship people are spending their own money to buy varnish because the varnish that was issued was "no good." The idea of an approved list of motorboat varnish manufacturers was evolved, and it takes almost an act of Congress to get on that list. A man has to submit his varnish, it goes to the fleet and is used for a year or two before they say it is ~~alright~~ all right or it is not ~~alright~~ all right, and they most generally say it is not ~~alright.~~ all right. Purchases are made from manufacturers on that list and no others, and even that does not give full satisfaction.

I have been very much interested in hearing Captain Hanson's talk. As I say, I am on the other end of his job. Very often, concerning some of the difficulties that he has mentioned this morning, we try to make him do the work out there, try not to run it too much in Washington, try to avoid being what some call "bureaucrats". It is a

great pleasure to me to return here. I am one of the alumnus of this school. Thank you very much.

Colonel Jordan: We are delighted to have had you here this morning, sir

Captain Hanson: In regard to the matter of the probability of "cost-plus" contracts again descending upon us in connection with future battleship construction, it may be of some interest to you to know of the reaction of a very well nationally known manufacturer in the Pittsburgh District when he received a schedule calling for deliveries of material on a bid today, within thirty days, etc., which ~~should~~ would apply over a period of two years in the future. This man, who is a high executive of his corporation, told me that he had advised his company not to bid at all on a schedule couched in those terms, that no one on this mundane sphere could predict what profit, if any, there would be or how serious the losses would be on a price named today to be applicable two years from today. In ~~appraising~~ advertising our schedules for battleship construction, etc; trying to project into the future as we must, the feature of what conditions of labor, wages, material availability, etc., will be at any stated time more than a few months ahead is always a sort of bugaboo to the bidder; and until conditions in the country are much better stabilized than they are today, that is going to be a deterrent in securing favorable bid prices from manufacturers. In other words, it boils down to the fact that confidence must be restored.

Colonel Jordan: Last year when the class finished its first part of the course Colonel Stewart, who was the President of the class,

came to me and said that they wanted to have a class gathering in here at which they wished the attendance of the faculty because they wanted to ask a number of questions with regard to which the class was unsettled. We came; and the next speaker that I am going to call upon, an officer of the Construction Corps of the Navy, who was then a student at the College, got up and said that he had heard me more than once make statements about Rock Island Arsenal situated on Rock Island; that he had spent a great deal of time and gone to much trouble in searching all the Navy maps that he could find in the Navy Department and he could not find any "damned Rock Island" I want to call on this man to say something. Commander McDowell, please get up and tell the class something.

Commander McDowell: Colonel Jordan, I always feel very much at home here in the conference room of The Army Industrial College. I might say that I subsequently learned where Rock Island is I have enjoyed Captain Hanson's talk very much, I think he has been very inclusive and most complete. I have no special question to ask him, but I should like to say that I have enjoyed his talk most thoroughly. Thank you.

Colonel Jordan: The discipline in the Construction Corps is in good shape, gentlemen! (Prolonged laughter).

Captain Hanson, I can not tell you how much we appreciate your coming down here and giving this talk. It has been perfectly fine, sir. You have made this one of the outstanding days we have had in the course. Thank you very, very much.