

forms of numerical variation of the spine may cause certain kinds of lateral deformities.

The x-rays show that corresponding clinical types of "habitual lateral curvature" in the great majority of cases show the variation expected at the seat of the primary curve.

The "habitual" scoliosis manifests itself at the very time at which physiological growth and changes allow the appearance of curves, based upon a "varying" development.

The different affection of the two sides of the spine in "habitual lateral curvature" corresponds with the peculiar relation of the right and left sides of the spine to the numerical variation.

Based upon these arguments and upon the fact that, in 16 out of 20 cases of so-called "habitual" scoliosis those "pathological" types of variation were found at the primary seat of the deformity present, the following statement seems to be justified:

THAT DEVELOPMENTAL ERROR OF THE HUMAN BODY OCCURRING IN EMBRYONIC LIFE, WHICH HAS ITS MORPHOLOGICAL EXPRESSION IN THE SO-CALLED "NUMERICAL VARIATION" OF THE SPINE, CAUSES UNDER CERTAIN CIRCUMSTANCES THOSE IDIOPATHIC LATERAL DEFORMITIES OF THE SPINE WHICH MANIFEST THEMSELVES IN THE FIRST HALF OF THE SECOND DECADE OF LIFE AND WHICH HITHERTO HAVE BEEN CONSIDERED AS AFFECTIONS ACQUIRED IN POSTNATAL LIFE OWING TO PURELY FUNCTIONAL OR FUNCTIONAL-OSTEO-PATHIC CONDITIONS.

IT SEEMS TO BE THE ETIOLOGICAL FACTOR OF "HABITUAL" LATERAL CURVATURE, BETTER NOW TO BE CALLED DELAYED CONGENITAL SCOLIOSIS OR SCOLIOSIS CONGENITALIS TARDA.

In concluding, I desire to thank here all those who have given me advice, help and assistance in carrying out the work.

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EXPLORATORY PUNCTURE OF THE PERICARDIUM, WITH A REPORT OF THREE RECENT CASES.

BY GEORGE G. SEARS, M.D.,

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CASE I. Philip R., seventy years old, was admitted March 17, 1906. He had never been ill enough to be in bed since his youth. Two weeks before admission pain came on suddenly in his left side and for about a week was extremely troublesome. Dyspnea accompanied the pain and he soon noticed that his abdomen and legs were swollen. On entrance he had general edema. The area of cardiac dullness showed decided enlargement. The heart's action was somewhat irregular, but no murmurs were heard. Two days later a well marked friction rub developed over the precordium. It became less audible after a few days. The precordial dullness gradually extended until it reached on the right nearly to the nipple line, and on the left to the nipple line at the level of the fourth rib, where it merged into an area of dullness situated at the base of the left chest. The upper limit extended to the second rib, the general shape of the dull area being triangular. The heart sounds became very feeble and distant and the impulse imperceptible. No pulsus paradoxus. Over the dull area at the base of the left chest fremitus, voice and respiration were diminished. His temperature ran an irregular course but rarely exceeded 100°. As there was no tendency for the fluid to absorb, and as the patient's general condition was growing less satisfactory, the pericardium was aspirated on April 10 through the fifth left space outside the nipple line and 650 cc. of bloody serum were removed. The needle was then withdrawn as the heart could be felt beating against its point. The fluid at first came freely without suction. The patient expressed himself as considerably relieved, and the edema diminished, but the fluid rapidly recollected. The effusion in the left pleura increased and on April 24 it was tapped and 1,000 cc. of clear, yellow serum were drawn off. Reaccumulation was rapid and but temporary relief was obtained. The patient complained of considerable dyspnea which was somewhat paroxysmal in character. There was marked obstruction to the return flow of blood from the upper extremities. The capillaries of the neck and upper part of the trunk showed a condition of stasis, and the ears, nose and finger tips were slightly cyanotic. An attempt was therefore made, on April 29, by introducing a needle in the fifth space just outside the previous puncture, to empty both the pleural cavity and the pericardium without withdrawing the needle. Immediately after it was inserted there was a sudden gush of a few drams of bloody fluid, similar in appearance to that obtained before from the pericardium, and then its color changed abruptly to a clear yellow. Four hundred cubic centimeters of the latter were withdrawn before it ceased to flow. The needle was then pushed in the direction of the heart until it came in contact with a pulsating body, which was either the pericardium or the heart. The determination of this point was not made as through an oversight on the part of the house physician, to whom I had delegated the operation, the needle selected was so large that I feared to enter it further, although the sense of resistance suggested pericardium rather than heart. This was confirmed at autopsy, which also showed that the sudden gush of bloody fluid could have no other source than the pericardium. He was somewhat relieved by the removal of the pleural fluid and no further effort was made at this time. On the fourth

of May he insisted upon going home, but returned ten days later in much poorer general condition and with general anasarca and cyanosis. Except that the fluid in the left pleura had increased, physical examination of the chest showed no special changes. On May 18 the left pleura was again tapped, the needle being introduced in the ninth space in the back and 750 cc. of clear fluid were withdrawn. On the following morning signs of pneumothorax were noted. On May 20 the following condition was present: The left side of the chest was distended with marked tympanitic resonance throughout the front and axilla. On inspiration there was a slight retraction of the upper five interspaces on the left, which was most marked in the fifth, in which, just beneath the nipple, the retracted surface popped suddenly outward during expiration with a sound like the breaking of a bubble, which could be heard at least ten feet away from the patient. A wave-like motion terminating at the point of sudden expansion followed the fifth interspace inward from the anterior axillary line. On palpation a series of coarse crepitations were felt on inspiration, which suggested the rupture of small bubbles, and the same phenomenon was felt on expiration but the bubbles were coarser. These bubble sounds were heard on both inspiration and expiration over the front of the left chest as high as the second rib, and outward into the axilla, while the expiratory sounds could be heard over the right front also. The respiratory murmur was audible with fair intensity down to the fourth rib; below, it was diminished to absent, and the voice sounds here and in the axilla were feeble and distant. When the patient sat up there was dullness over the lower half of the chest with tympany above, the change in the percussion note being immediate, and the bubble phenomenon disappeared. This extraordinary phenomenon persisted until the air in the left pleura was practically absorbed, which required about two weeks. He failed gradually and died on June 12. The anatomical diagnosis was tuberculous pericarditis, miliary tuberculosis of the lungs, pleurae and kidneys, and tuberculosis of the intestines, the latter being confined to four small areas at the lower end of the small gut. The pericardial cavity contained 550 cc. of sanguineous fluid, swarming with tubercle bacilli. All the air had been absorbed from the left pleura which contained 900 cc. of yellow fluid. Besides a few fibrous bands which united the parietal and visceral pleura there was a firm adhesion which united the tongue of lung which covers the heart to the pericardium. The presence of this adhesion in connection with a pneumothorax (or hydro-pneumothorax) probably explains the peculiar phenomenon which was noted in its neighborhood.

CASE II. Housin K., an Albanian, twenty-eight years old, was admitted April 10, 1906. He had never had rheumatic symptoms and had always been well up to three months ago, when he began to complain of pain in the epigastrium. He paid little attention to it until about two weeks before entrance when it increased, and he began to have nausea and occasional vomiting. When admitted, the area of cardiac dullness was roughly triangular and extended on the right to the nipple line, on the left nearly to the anterior axillary line and above to the second rib. The heart sounds were hardly audible. No murmur or friction was heard. The pulse was small and weak and the patient much prostrated. His temperature during the first twenty-four hours varied between 100° and 101°. The amount of fluid in the pericardium was so large and his general condition so poor that, on the following day, an aspirating needle was introduced into the pericardium through the fifth space outside

the nipple line, and 400 cc. of bloody serum were withdrawn. Although the fluid was still flowing freely, the operation was stopped as the heart's action became very irregular. After aspiration the area of cardiac dullness was found to be greatly diminished and, for the first and only time in my experience, its general outline was more or less pear-shaped. A to-and-fro friction sound was now present over the left edge of the sternum which persisted, with occasional changes of location, for over two weeks. His temperature, which did not return permanently to normal until May 15, was kept elevated by the development of a double pleurisy with effusion. The right chest was later aspirated on two occasions, clear fluid being obtained. After he had been up and about the ward for about three weeks he was discharged at his own request on June 17. Fluid was still present in his right chest but none could be detected in the pericardium. The case was probably tuberculous in origin, the primary focus being the apex of the right lung, which was somewhat duller on percussion with slightly harsher respiration than the left. The difference was slight, but the x-ray cast a shadow. The pericardial fluid was sterile and contained a large majority of small mononuclear cells.

CASE III. Vito S., sixteen years old, was admitted April 11, 1906, with a history of rheumatic fever when six years old, which kept him in bed a year. Otherwise well up to five days ago when he began to have pain across his chest and shortness of breath. The patient was a pale, poorly nourished boy, much prostrated. The right border of cardiac dullness extended an inch and a half to the right of the parasternal line, meeting the upper limit of hepatic dullness at more than a right angle. The left border began at the second cartilage and ran downward and outward to the sixth rib in the mid-axillary line, where it met an area of dullness at the base of the left chest. No friction rub was heard, but a loud musical systolic murmur was present over the whole precordium, most marked in the fifth space in the nipple line, and was transmitted into the axilla. The second pulmonic sound was strongly accentuated. The left chest below the angle of the scapula behind was dull, but fremitus and respiratory sounds were present to the base. There was marked inspiratory aspiration of the vessels of the neck but no pulsus paradoxus. The presence of fluid in the pericardial sac was confirmed with the x-ray by Dr. F. H. Williams. The heart was much enlarged and it was doubtful if a large amount was present, but as the temperature, pulse and respiration were rising and his condition seemed serious, an exploratory puncture was made with a needle introduced in the sixth space in the anterior axillary line and pushed inward until the heart could be felt beating against its point. About two drams of clear fluid spurted out and then no more could be obtained. A second attempt in the fifth space close to the right edge of the sternum was without result. His later history was that of many cases of severe rheumatic infection in which the heart and pleura are involved. A large effusion developed in the left chest which twice required aspiration. The cardiac muscle became more and more incompetent and general anasarca came on. His pulse rose to 130 and his respirations to 40. His condition appeared almost hopeless and then improvement began and continued steadily until he was discharged on June 12 at his own request.

Although each service at the hospital has usually presented at least one occasion for exploration of the pericardium, this is the first time

that I have had the opportunity to attempt the operation three times within five days. In all three cases, the needle was first introduced in either the fifth or sixth left space in the neighborhood of the anterior axillary line, and then pushed inward toward the heart until fluid was obtained. In the first this site was chosen because a soft friction sound could be distinctly heard over the whole precordium, as if the heart was close to the anterior chest wall and therefore in danger of being wounded if the needle were inserted near the sternum. The selection of the same route in the second was chiefly determined by the success of the previous day. In the third there was added reason for adopting it, yet I confess to a feeling of greater confidence when introducing the needle at this point than when it is plunged in directly over the heart, which the experience of surgeons, who have found that the heart not infrequently lies close to the anterior chest wall, when the pericardium is opened to secure permanent drainage, has shown to be reasonable.

While it is doubtful if every case of pericardial paracentesis has been recovered, owing to the difficulty of tracing them in the very imperfectly indexed records of the hospital, thirteen have been found which came under my personal observation. Positive results were obtained in eight of these, the amount of fluid varying from a few drams (two cases) to 38 oz. The fifth or sixth left space at or beyond the extreme limit of cardiac dullness was used successfully in five of the seven cases in which it was tried. In one of the two unsuccessful cases fluid was obtained through another route as stated below. I have been deterred on several occasions from selecting this route because of the dullness in the lower part of the left axilla, the result either of coincident pleural effusion or of compression of the lung, which is always present in cases of large pericardial exudates and which makes it impossible to determine accurately the outer limit of the pericardium, but the first case, where such a condition existed, shows that this need not be an obstacle. In the other three successful cases the fourth and fifth right spaces were each used once, and in the remaining case, fluid was twice obtained through a needle inserted below the costal margin, the effusion being so large that it depressed the diaphragm and so distended the upper portion of the abdomen as to lead to error in diagnosis. The first insertion of the needle was by no means always successful, for in one case three attempts were made in the fourth and fifth left spaces without result before one in the fifth right obtained fluid; in another a dry tap in the fourth right space was followed by success in the fifth left at the outer limit of dullness, and in a third the reverse happened, though here the fifth was used instead of the fourth right space. In the five unsuccessful cases, the fourth right space was tried three times and the fifth right, the fifth left close to the edge of the sternum, and the fifth left beyond the limit of dullness, once each. In all, twenty-three

attempts were made in these thirteen cases to aspirate the pericardium, of which thirteen were unproductive. Although the greatest number of successes, as well as the largest amounts of fluid, were obtained through the fifth or sixth space at or beyond the outer limit of dullness, this route has the great disadvantage that the pleura, and often the lung, must be traversed, thus giving an opportunity, in case pus is present, for further infection. Some other site should, therefore, be selected when the effusion is presumably purulent. While I have had no ante-mortem experience with Larrey's route, the left costo-xiphoid angle, it has theoretical advantages, especially in its avoidance of the pleura, which fully justify Fitz's remark that "this way into the pericardium should always be favored in cases of suspected exudation, if not in the first instance, certainly when aspiration at other points has proven ineffective." He was confirmed in his opinion by a successful post-mortem aspiration here after two failures during life in the fourth and fifth interspaces near the sternum, but success appears to be no more constant, even after death, here than in other situations, for out of three cases in which I have asked my house officers to aspirate post-mortem in the left costo-xiphoid angle, two failures resulted. One of these occurred in the first case recorded above although several hundred cubic centimeters of fluid were found at the autopsy; in the second, although an attempt made during life to aspirate through the fifth left space beyond the limit of dullness was without result, a post-mortem tap in the same situation yielded 2 oz. after Larrey's point was unsuccessfully tried. Whatever the site selected and whether done ante-mortem or post-mortem, an element of luck is always present which seems most frequently to depend on the clogging of the needle by particles of fibrin. As it is difficult to make pericardial fluid flow even under most favorable circumstances, a preliminary puncture with a hypodermic needle was discarded after the earlier cases. The possibility of doing harm may be somewhat diminished by its use, but this is practically negligible if the larger needle is inserted with care. It has always come in contact with the heart in these cases during some part of the process; in fact, that organ has always been sought when the flow was not immediate in order to ensure the presence of the needle in the sac. The heart, except perhaps in children, appears very tolerant of puncture and at times seems even to be stimulated by it. The question of possible harm was raised but once in these 13 cases, and then only because death occurred within twelve hours. This was in a patient very ill with pneumonia, whose pericardium was punctured unsuccessfully in the hope of relieving the pressure of the surrounding fluid. The heart was struck by the needle and it is possible, though hardly probable, that death was hastened by it. Out of 79 cases collected by West, prior to 1883, only one instance is recorded where the operation was in itself fatal, and of the 14 mentioned by

Fitz, in which the operation has been done at the Massachusetts General Hospital, it was not responsible for any death. When but two fatal results, one of which was very doubtful, occur in a series of over 100 cases the operation must be considered reasonably safe. Forty-eight in West's series, 5 of the Massachusetts Hospital cases and 6 of my own died, but this was due to the progress of the underlying disease which pericardial exploration was unable to prevent.

The indications for exploration of the pericardium, which have long been accepted as the guide to operation, have been based on the persistence of a large effusion in spite of treatment, on the failing strength of the patient in consequence of the effusion and on the danger to life from extreme dyspnea. No question can arise as to the proper course under such circumstances; relief should be given, if necessary by a permanent opening. There is also no excuse for delay where pus is suspected, but it is still debatable, since our limited experience with the operation has as yet given insufficient data for decision, whether it should not be done as a means of hastening cure along the same lines which are followed, more or less as a matter of routine, in treating pleurisy with effusion. Both are serous surfaces and liable to the same forms of inflammation, but the analogy is not complete from the therapeutic standpoint. We may try after aspiration to limit pleural adhesions by restricting the movement of the chest, but we cannot interfere with the activity of the heart. While a pleural effusion, after the acute stage has subsided, has apparently little practical value, the even pressure of the surrounding fluid in pericardial effusions, as Ewart has pointed out, may give some support to vessels inclined to active dilatation. It has also been suggested that the prolonged separation of the two inflamed surfaces of the pericardium by fluid may prevent adhesions by giving time for the inflammation to subside before they again come into apposition. This possibility may be acknowledged, but their formation depends far more on the nature and severity of the process, and the advantage secured by an early arrest of the inflammation from a timely aspiration, as in pleurisy, in which it is confidently claimed that it prevents their development, might more than compensate for the doubtful good which the continued presence of the fluid might do. An illustration of the good effect of paracentesis is furnished by Case 2 in which it was followed by an immediate fall in the temperature and the rapid absorption of the remaining fluid. The relative value of pericardial paracentesis, as a curative and not as a life-saving measure, as an operation from choice, not from necessity, can only be estimated by comparing the end results of two sufficiently large series of cases, in one of which it has been employed for reasons similar to those which would justify aspiration of the pleura, while in the other the expectant plan of treatment has been carried out; but so long as the present conservative attitude toward the operation is

maintained, which makes F. C. Shattuck's eight cases, Romberg's twelve and my own thirteen an unusual record of individual experience, if the published cases are a criterion, such a comparison will be impossible owing to the inadequate number available. This conservatism has been fostered by the frequent instances of spontaneous recovery and the unsatisfactory results which have thus far been obtained in pericardial paracentesis, but it has been overlooked that it is usually postponed until it has become a last resort in desperate cases and that an earlier operation, or even a more radical one, would undoubtedly have greatly increased the number of recoveries. A reaction toward more radical treatment has lately been apparent, to which the growing percentage of recoveries after permanent opening in cases with purulent effusions has largely contributed, and an increasing tendency has also been shown by surgeons to relieve the physician of the care of cases, where operative interference is indicated, by advising incision on the score of added safety and efficiency. Brentano, who has operated upon five cases with four deaths, all of which were due to the further progress of a necessarily fatal disease, puts the matter very succinctly from the surgical standpoint. He says that in all his cases the bulk of the fluid was behind the heart, which lay close to the front wall of the chest, and consequently was in danger of puncture if a needle had been used; that the pleura is almost necessarily wounded in aspiration and is, therefore, liable to infection; that aspiration is an incomplete operation and frequently has to be repeated, and that adhesions are less general after permanent opening than after puncture. While advocating a permanent opening as the operation of election, he modifies this statement by restricting it to those cases where the fluid has rapidly reached a life-endangering amount, and especially warns against its use where cardiac disturbances of long standing are present and where the possibility of previous adhesions exists, and frankly criticises his own act in operating on some of his cases. Even if all his premises are granted, aspiration would still retain a wide field of usefulness, for experience has shown that it is a reasonably safe procedure and in desperate cases it is less dangerous than to submit the patient to a much longer and severer operation, while the relief furnished, even if temporary, may place him in better condition to undergo more radical treatment. Even under the restricted use which has thus far been made of it, it has proved itself a valuable means of diagnosis, of palliation and often of cure, but where aspiration fails or where the fluid repeatedly reaccumulates and the underlying condition is not incurable, or where there is a strong probability of pus, a permanent opening should be favorably considered.

The result of my experience with the cases which have come under personal observation, combined with some unfortunate instances in which autopsy showed that life might have been saved but for an ill-timed conservatism, has

been a growing tendency to emphasize the points of similarity between pericardial and pleural exudates, and, instead of delaying until it has become the only hope of cheating death of an expected victim, to resort to early aspiration in the hope of cutting short the disease or of getting valuable information which may aid in prognosis or further treatment.

Boston City Hospital.

CASES SHOWN BY THE STAFF AT THE MEETING OF THE AMERICAN MEDICAL ASSOCIATION, JUNE, 1906.

THE ORIGINAL CASE OF ESOPHAGOTOMY.

BY DAVID W. CHEEVER, M.D., SENIOR SURGEON.

THE case was operated on *forty* years since, being the first time this operation was done in America. Only fifteen cases, in Europe, were recorded previously. Surgeons feared an incurable fistula.

In this case a fishbone had been lodged in the throat three days. Fever, chill and dysphagia. Operation by cutting down in the side of the neck and opening the esophagus. Foreign body extracted. Wound left open. Closed in seventeen days. I have operated six times and always left the wound open.

Nothing was given by mouth for twenty-four hours, then water, milk and water, milk. The wound had always closed and remained perfect.

LIGATURE OF THE INTERNAL ILIAC ARTERY.

BY GEO. W. GAY, M.D., SENIOR SURGEON.

A CASE in which I assisted Dr. William H. Thorndike tie the internal iliac artery for secondary hemorrhage. The patient, a hardy, healthy man, is fifty-six years old. He has had an unusual series of misfortunes in the way of personal injuries from which he has fairly well recovered, notwithstanding the fact that the events took place before the days of antiseptics.

First, while running, he fell striking upon his face cutting a large gash in his lower lip through which four of the lower incisors were driven. The patient removed the teeth from the wound in which they lay, and carried them to a dentist in the neighborhood, who replaced them in their original sockets within half an hour. Three of the teeth renewed former connections and are in place to-day. One came out.

Second, while working upon a staging he fell head foremost into shallow water, striking upon "granite chips," and receiving a compound fracture of the skull upon the left vertex. He recovered in due time with no bad after-effects.

Third, while serving as a fireman he fell from a building into a peach tree and was impaled upon its branches. A limb about an inch in diameter penetrated nearly a foot through the ischio-rectal fossa to the left of the anus. A small piece was removed by incision above the crest of the ilium on the left side; the remainder was pulled out from below. Severe secondary hemorrhage came on in about seventeen days. After the second attack Dr. Thorndike tied the internal iliac artery through the classical incision in the left iliac region. He recovered without any serious complications.

Fourth, about two years later his foot was caught between the ferryboat and the drop, and was crushed. His leg was amputated four inches below the knee. He now walks so well with his artificial leg, that one not knowing him, would notice nothing unusual in his gait. He climbs ladders, rides a bicycle and does anything that a man of his age with two good legs does.

GASTRIC ULCER.

BY E. M. BUCKINGHAM, M.D.

CASE I. This patient is interesting chiefly for diagnosis. She had gastro-enterostomy six years ago for an ulcer, that the surgeon now believes did not exist. Slight dilatation of the stomach; distress and vomiting after meals; tenderness. Symptoms occasionally return, and all, including dilatation, are relieved by regulated diet. There is a neurotic element.

CASE II. Had slight hemorrhages for four years. Became worse in 1903, with vomiting and rigid abdomen. Exclusive rectal feeding for nine days, but then vomited the first food taken by mouth. Gradually recovered use of stomach, and remained well eighteen months. Symptoms returned suddenly, but with tenderness on opposite side. At operation scars of old ulcers found, giving clinical proof that she had really recovered; that the new symptoms were not a lighting up of an old unhealed ulcer, but were a new case of disease, due to a return to old conditions of life. She has been twice operated upon, and since then twice discharged relieved without operation. The history teaches the hopefulness of persistent non-operative treatment, and the need for later medical supervision. Free HCl is not always present.

CASE III. Two years ago vomited bloody mucus, and treated for gastric ulcer. Now on admission, pain, vomiting, definite and extreme tenderness in epigastrium, and in back at level of eleventh dorsal. Food omitted, nutrient enemata two weeks, but daily vomiting. Frankly abandoned treatment and tried to feed by mouth, as prelude to operation. Vomiting ceased with the enemata, and recovery has been steady. Lesson: Complete stomach rest was efficient, but either the enemata or the opium in them kept up vomiting until admission to the hospital.

CASE IV. Chill and vomiting three days before entrance. Tenderness in right epigastrium; rigidity. Typhoid temperature, but no other sign or symptom of typhoid. Rising leucocytosis. Medical consultant suggested possible perihepatitis; surgical consultant suggested possible partial perforation, gangrenous gastric ulcer. Advised against operation. Fed solely by rectum for seven days. Now gradually added food by mouth. Gained in all ways steadily from first day. Tenderness lasted a month, but in bed longer to lessen peristalsis. Gained weight on 48 oz. peptonized milk and broth. Returned from convalescent home to-day quite well. Treatment lasted about three months.

CASE V. Pain, tender, not rigid. Admitted, then lost 1½ pints of blood by rectum and mouth. Hgb., from .95 to .50. Lost 1,100,000 reds. Solely rectal enemata six days. Thirst relieved by 1 pint normal salt solution by rectum every six hours, followed in three hours by nutrient. Cracked ice is dangerous.

PAPILLOMA OF THE LARYNX.

BY J. W. FARLOW, M.D.

I SHOW a boy fourteen years old, from whom I had removed a very extensive papilloma of the larynx two years before. The boy had suffered from intense dyspnea, and several futile attempts had been made to relieve him. I removed enough of the growth to relieve the dyspnea, and then, with the Dundas Grant