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SOME OBSERVATIONS ON OCCUPATIONAL MARKINGS*

Gilbert Forbes

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When an unidentified body or dismembered remains are found many factors have to be taken into consideration in endeavoring to establish the identity of the deceased. Every policeman knows the importance of the height, weight, sex, colour of hair and eyes, presence of scars, tattoo marks, deformities, etc. The state of the teeth is of the utmost importance, and there are many well-known cases which illustrate the extent to which this may assist in establishing identity, particularly when the pathologist and police are working in association with an efficient dental surgeon who keeps careful records. The clothing may bear laundry marks or tailors' tabs, and if it does not, then the quality and condition of the garments may assist in establishing to what stratum of society the deceased has belonged. An examination of the debris in the pockets or embedded in the wax of the ears may assist in the case of workers exposed to a dust-laden atmosphere. While individual items may alone prove little, the sum total may be quite convincing, and consequently each additional factor may be of importance.

A high proportion of the members of any community work with their hands to some extent. One would expect, therefore, that in the case of the pure manual worker, his toil would leave marks on his hands. The horny hand of the labourer is easily distinguished from the soft hand of the clerical worker or professional man. In modern industry many manual workers are engaged on purely repetitive tasks using only a limited number of tools. One would be entitled to deduce from this fact that the continual use of one or two tools in a particular way might leave characteristic marks on the hand of the worker, and that this might prove a valuable aid in trying to identify a body.

In order to test this theory, some 300 men from all walks of life were examined. They were all part-time members of the

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National Fire Service. These men were each interviewed separately, their occupation was enquired into and particulars were taken of any markings visible. Charts were also prepared showing the situation, size, and shape of the marks, and in representative cases photographic records were made, filed, and annotated.

For convenience, all occupations can be roughly subdivided into four main categories, namely Non-Manual, Light, Medium, or Heavy Manual. The divisions between them are largely artificial as there can be no clear-cut line of demarcation between the different groups. However, this system is useful from the point of view of classification and description.

NON-MANUAL WORKERS

These, as would be expected, showed no characteristic hand markings. This group included commercial travellers, insurance agents, metallurgists, managers, teachers, company directors, etc. The fact that they were non-manual workers was obvious from the soft smooth clean condition of the hands and the absence of hypertrophy of the skin and of the muscles of the thenar and hypo-thenar eminences.

LIGHT MANUAL WORKERS WITHOUT CHARACTERISTIC MARKS

Many light manual workers showed no hand markings at all and might have been mistaken for non-manual workers. Some had marks suggesting that they worked with their hands, but the marks were indefinite and not in any way characteristic. In this category the following occupations were included: Plumber, cylindrical precision grinder, electric crane driver, pliers assembler, steel warehouseman, engineer's slotter, steel inspector, small tool hardener, tyre specialist, aircraft fitter, woodworking machinist, crane slinger, bread van packer, paint manufacturer, maintenance engineer, electrical store keeper, electrical inspector, machine mark maker, drop-stamping inspector, scientific instrument maker, optical profile grinder, pattern maker, tool inspector, and electro-plater.

LIGHT MANUAL WORKERS WITH CHARACTERISTIC MARKS

(1) *Bread Baker*. The dough is baked in bread tins with sharp edges. The baker picks up two tins in each hand, using the index and middle fingers inside the tins and the remaining fingers outside. The sharp edges of the tins produce callosities on the adjacent sides of the distal interphalangeal joints of the index



Figure 1.

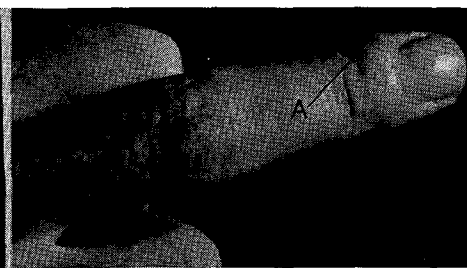


Figure 2.

and middle fingers (Fig. 1A). Similar callosities may be found higher up the same sides of these fingers. These marks are typical of the trade.

(2) *Optician*. A practical optician preparing lenses inflicts small cuts on the tips of the index finger and thumb of both hands. Glass dust is found under and around the nails. The hands are otherwise unmarked.

(3) *Clerk*. A definite callosity is found on the outer side of the distal phalanx of the middle finger of the right hand due to holding the pen (Fig. 2A). The hands are otherwise soft and clean.

(4) *Draughtsman*. Holding the drawing pen produces a thickening on the middle finger of the right hand in the same position as that on the finger of a clerk (Fig. 3A). This is constantly

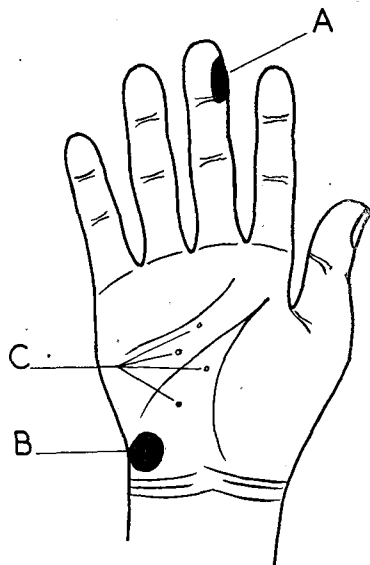


Figure 3.



Figure 4.

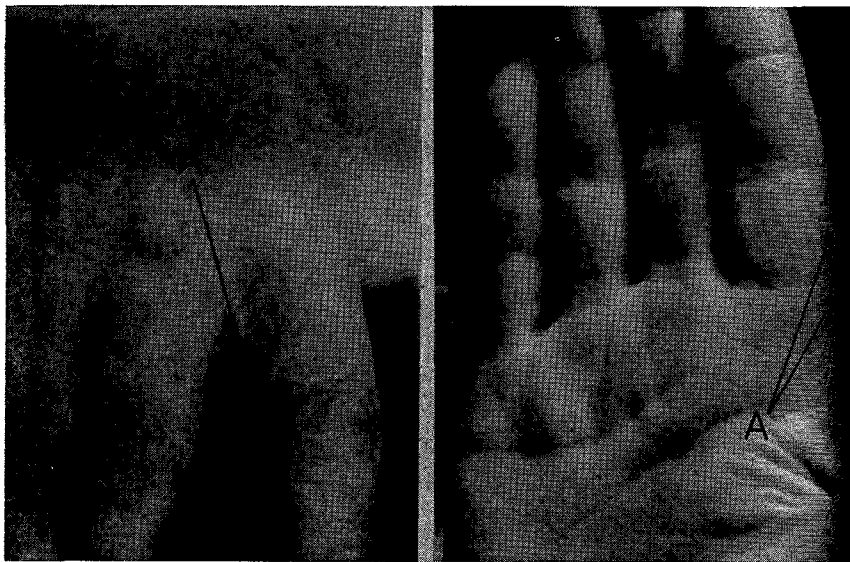


Figure 5.

Figure 6.

found. In addition, sliding the hand along the drawing board leads to the formation of a callosity at the base of the hypothenar eminence (Fig. 3B). This may be found on one or both hands. Resting the left elbow on the board produces a chronic olecranon bursitis. Often when the pencil is held reversed in the hand the blunt end may be knocked against the board and the point driven into the palmar skin. Small black lead pencil marks are found on the palm of the right hand as a result (Fig. 3C).

(5) *Tailor*. The hands are soft and clean, but marks due to small injuries from the point of the needle are found on the outer side of the tip of the index finger of the left hand (Fig. 4A).

(6) *Glass Cutter*. He holds the diamond in the cleft between the index and middle fingers of the right hand, and this produces blistering and thickening of the skin in the web between these two fingers (Fig. 5A). On the palms of the hands and on the palmar surfaces of the fingers there are innumerable cuts of various depths inflicted by the sharp edges of the cut glass.

(7) *Office Machine Mechanic*. The nail of the index finger of the right hand is flattened due to constant tapping on the keys, and the fingers tend to be stained blue or purple by the copying ink used on the machines.

(8) *Butcher*. Gripping the knife in the right hand thickens the skin on the palm at the roots of the fingers and on the

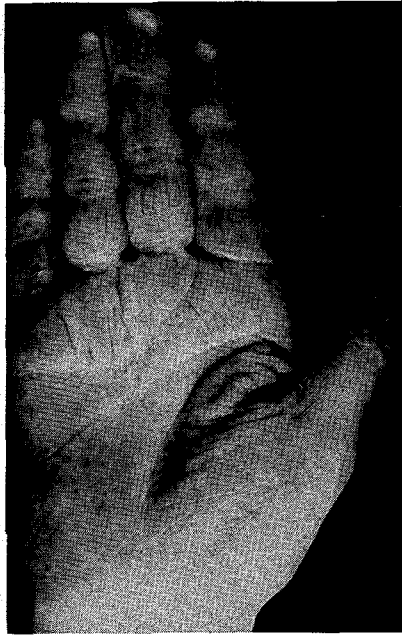


Figure 7.

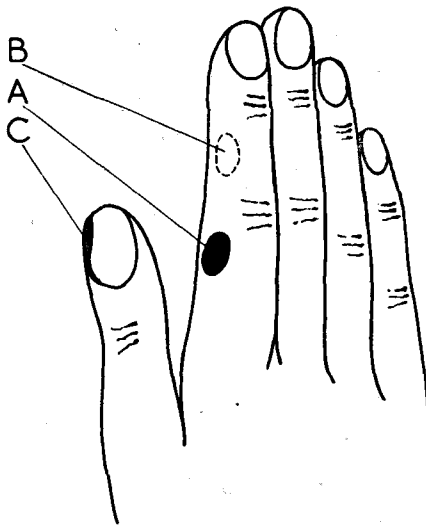


Figure 8.

palmar surfaces of the fingers. The left hand is devoid of these marks. On the index finger of the right hand there is a callosity on the radial side of the metacarpophalangeal joint due to pressure against the handle of the knife (Fig. 6A). When a boning knife is used and held as a dagger there is a thickening on the ulnar side of the middle phalanx of the little finger of the right hand. Grocers who use this type of knife have a similar mark. In addition pushing skewers into meat causes a thickening of the palmar skin just distal to the wrist creases. Scars from cuts are frequent on the left hand.

(9) *Battery Charger.* Contact with the acid in the batteries affects the skin, and the hands become heavily impregnated with dirt. This accentuates all the palmar fissures, and the blackening will not wash off. In addition there is some roughening and thickening of the skin on the outer side of the tip of the index finger due to screwing on terminals. Anyone working in sulphuric acid has his hands affected in this way (Fig. 7).

(10) *Dental Mechanic.* Using plaster knives produces callosities of a mild type on the palm of the right hand and on the right index finger. Holding casts against a polishing wheel produces a thickening of the skin on the outer side of the first phalanx of the index finger (Fig. 8A). Friction against the

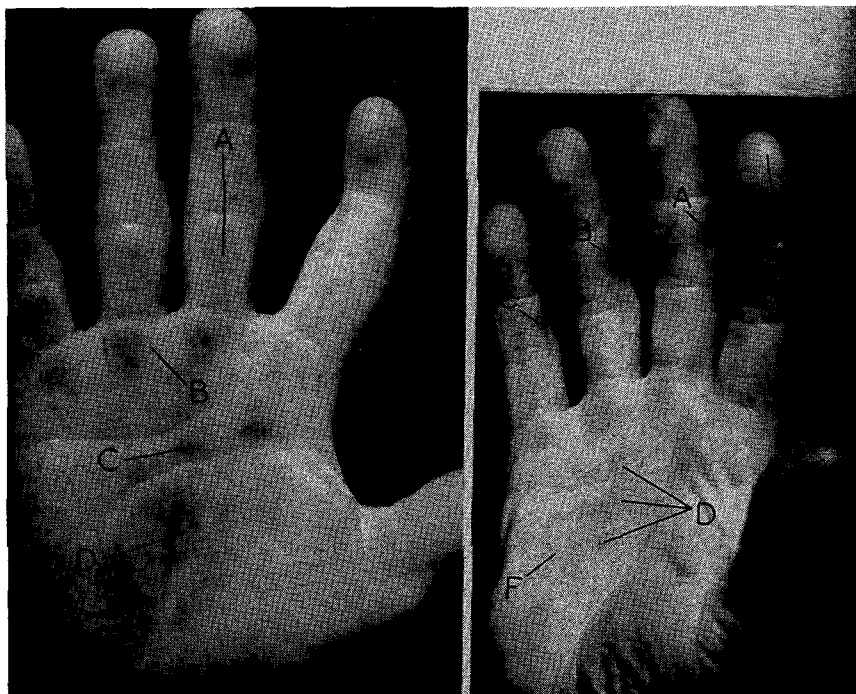


Figure 9.

Figure 10.

wheel smooths an area of skin on the radial side of the second phalanx (Fig. 8B), and wears away the radial side of the nail of the left index finger. In some cases the thumbnails may be ground to a point through using a large grinding wheel (Fig. 8C).

(11) *Machinist*. In this category of employment are included turners, lathe operators, millers, planers, and slotters. These men all operate machines which are set with spanners of various sizes. If the machine is light very few marks may be made, but if the machine is heavy the marks are accentuated. Gripping the spanners produces rows of callosities on the palmar surfaces of the fingers, at the roots of the fingers, and between the main transverse palmar creases (Fig. 9A, B, and C). Knocking home the spanners with the base of the palm produces a central thickening between the thenar and hypo-thenar eminences (Fig. 9D). If T-shaped keys are used, tightening them causes a thickening to appear on the radial side of the index finger of the right hand. Small pieces of metal tend to fly off the machine, and these may produce small superficial cuts on the skin of the hands which become ingrained with grease. Handling the metal causes

the skin of the finger-tips to be smooth and the fingerprints indefinite.

(12) *Spring Knife Cutler*. This workman makes pocket knives from the blades which are prepared and the raw material of the shafts. He uses principally hammer, file, emery glaze, and drills. Holding the hammer produces callosities on the side of the middle ring and little fingers and at the roots of the fingers (Fig. 10A, B, and C). The handle of the file thickens the central palmar skin (Fig. 10D). The tips of the index finger and thumb are smooth due to friction on the steel (Fig. 10E and G). The points of the blades produce small cuts on the skin of the hypo-thenar eminence (Fig. 10F). This is characteristic of cutlers in general through holding the blade of the knife in the hand while working on the handle. On the left hand, the tips of the thumb, index, and middle fingers are smooth from friction on the glazer. The file is held down with the left hand, and this thickens the skin on the thenar eminence and towards the centre of the palm.

MEDIUM HEAVY MANUAL WORKERS WITHOUT CHARACTERISTIC MARKS

The occupations included in this category are lorry driver, sheet metal worker, coal dealer, builder's labourer, chemical lead burner or industrial plumber, boiler maker, laminated spring maker, property repairer, pipe fitter's labourer, slinger, saw smith, structural engineer, vehicle body builder, gardener, railway shunter, machine knife maker, steel splitter, refractories hand moulder, and machine tool maker.

MEDIUM HEAVY MANUAL WORKERS WITH CHARACTERISTIC MARKS

(1) *Brass Turner*. His work involves mainly the application of various types of tools to the metal spinning in a lathe. The tool is gripped in the right hand, and this produces a typical thickening of the skin of the palm and fingers of this hand. The tool is steadied on a T-rest which is held in the left hand. Friction against this causes a large fleshy callosity over the radial side of the metacarpo-phalangeal joint of the left index finger (Fig. 11A).

(2) *Bricklayer*. He uses a hammer and trowel. Gripping the hammer shaft creates the usual "gripping" callosities on the palm of the right hand, and friction against the shaft thickens



Figure 11.

the skin on the radial side of the right index finger. On the adjacent side of the right thumb there is a corresponding thickening. Handling the bricks makes the tips of the fingers of the left hand smooth.

(3) *Joiner*. In spite of the fact that many different tools are used in this trade, characteristic marks are found. Holding the end of the box plane in the right hand thickens the skin in the centre of the palm and over the hypo-thenar eminence (Fig. 12A). Steadying the plane with the left hand coarsens the skin over the inter-phalangeal joint of the thumb and over the proximal inter-phalangeal joint of the right index finger (Fig. 13A). Holding the handle of the jack plane and saw thickens the skin over the terminal inter-phalangeal joint of the right index finger and over the inter-phalangeal joint of the right thumb (Fig. 14A). The skin on the fingers of both hands is rough, but there are hardly any "gripping" callosities in the ordinary sense. An occasional finding is scars on the proximal inter-phalangeal joint of the left index finger due to striking this area with the hammer.

(4) *Plasterer*. The hands are generally thickened and rough. The only characteristic mark is an adventitious bursa over the inner aspect of the meta carpo-phalangeal joint of the thumb of the left hand through holding the mortar board.

(5) *Coal Bagger*. Continually gripping the corners of the bags causes general thickening of the palmar skin of the right hand and produces a crescentic callosity at the root of the thumb. The continual friction against the rough bags smooths the finger-tips, and the gripping, as in many workmen, ultimately leads to an inability to straighten the fingers properly. If when the bag is carried it rubs against the back of the right hand, it produces a most unusual callosity there (Fig. 15A). This is an occasional finding and depends on the individual

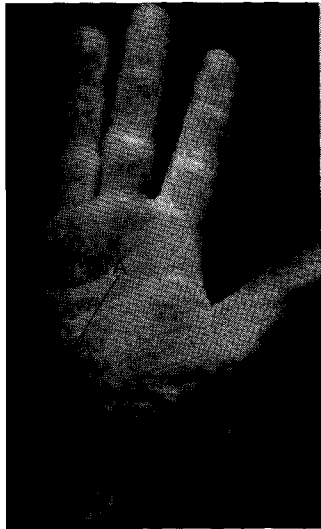


Figure 12.

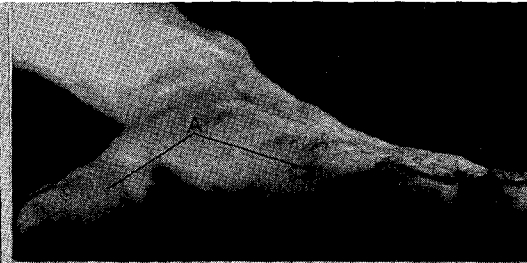


FIG.13.

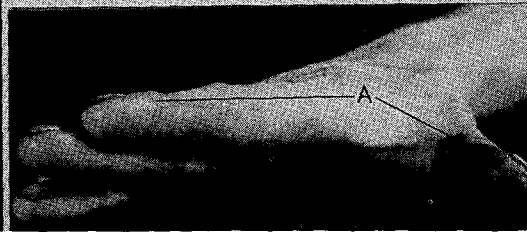


Figure 14.

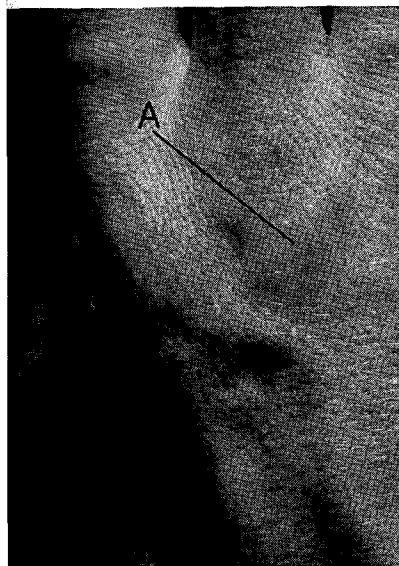


Figure 15.

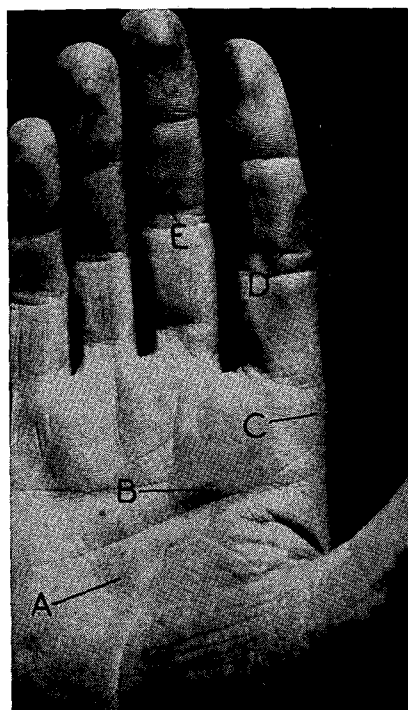


Figure 16.

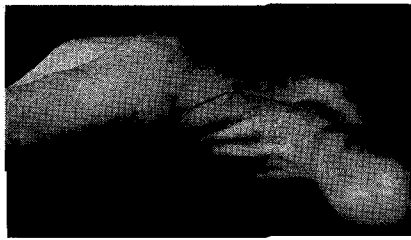


Figure 17.

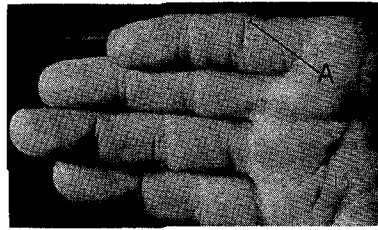


Figure 18.

method of handling the load.

(6) *Drop Stamper*. The markings in this case depend on whether the stamp is manipulated by the operator or by an assistant. In the former case he uses tongs in the right hand to pick up the hot metal. The handles of the tongs produce a characteristic thickening of the right hypo-thenar eminence and on the adjacent sides of the thumb and index fingers (Fig. 16A, B, C, and D). In addition, there is general coarsening of the palmar skin. The left hand is used to pull on the rope operating the stamp. This produces a characteristic thickening along the radial side of the first phalanx of the index finger of the left hand, and the thickened area also extends on to the adjacent parts of the palm. These marks are typical of the trade, and cuts in the skin due to the sharp edges of the metal objects are also found (Fig. 16E). In addition there may be small scars on the backs of the hands and arms due to hot scale flying about. If the stamp is activated by an assistant the marks of the tongs on one or both hands only will be found.

(7) *Hammer Driver*. The machine is operated by the means of a steel lever held in both hands. The hands are generally thickened, and the lever passing between the index finger and thumb of each hand thickens the skin on the adjacent surfaces of the thumb and index finger (Fig. 17A).

(8) *Armature Winder*. This trade involves winding wires of various gauges on coils by hand or by machinery. The skin of the tips of the fingers and thumbs becomes hard and shiny. Great thickening of the skin of the fingers is seen while the palmar skin is relatively soft. The wires are tied with string after they are wound, and breaking the string gives rise to a callosity on the ulnar side of the little finger opposite the proximal inter-phalangeal joint (Fig. 18A). This mark is characteristic of the trade.

(9) *Grinder*. These men all work in an oily solution which

makes the skin of the hands very soft. When not working the hands are moist and sweating, and, though they may look rough, they feel soft. Gripping the "job" to apply it to the wheel, or handling spanners to set the machine, produces the usual atypical palmar thickening, the size and situation of the thickened areas depending on the size of the articles ground and on how they are held. Holding the "job" against the wheel and handling the rough metal articles makes the finger-tips shiny right up to the edge of the nails. The finger-tips may bleed in winter time. The soft hands are readily damaged and rough edges may inflict small wounds. Tiny fragments of metal may become embedded in the superficial layers of the skin.

(10) *Maintenance Fitter and Machine Tool Fitter.* Men in this trade use many different types of tools, and in some cases the marks, for this reason, are not very typical. They use files, scrapers, hammers, and chisels mainly. Holding the handle of the tool produces a central palmar thickening on the right hand which is typical of the trade (Fig. 19A), and holding down the file with the left hand results in the formation of a similar mark on this side. The tips of the fingers are shiny from contact with the metal, and over the metacarpo-phalangeal joint of the left index finger or thumb there are scars due to imperfections in the head of the chisel or to striking this area with the hammer. Small cuts are frequent.

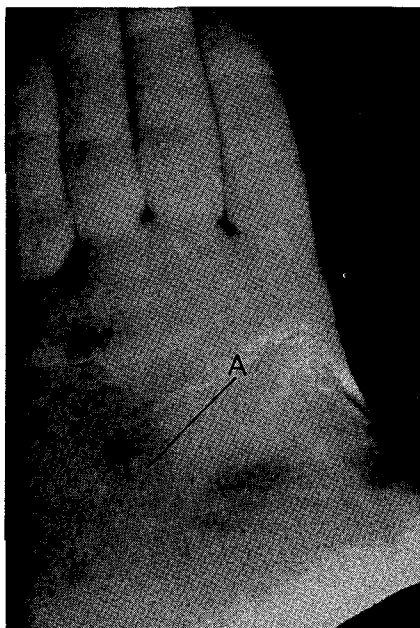
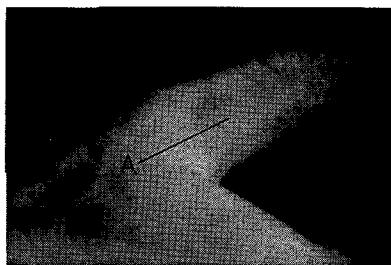
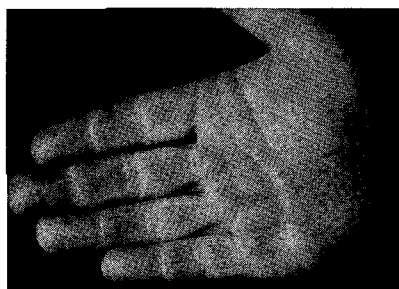
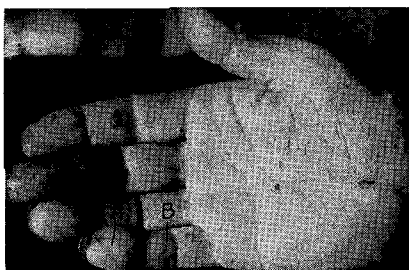
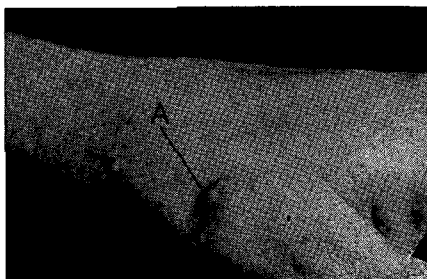
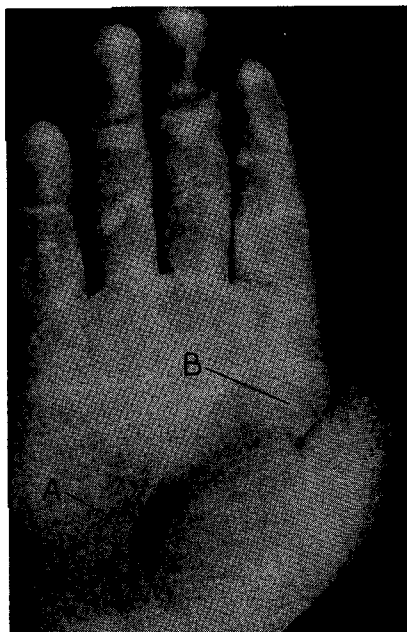
HEAVY MANUAL WORKERS WITHOUT CHARACTERISTIC MARKS

The following occupations fall into this group; farm labourer, colliery workers other than hewers, drop stamper's assistant, boiler stoker, charge wheeler, wire drawer, shearer and breaker of metal, hardener and temperer, file smith, fettler, furnace-man, steel annealer, and shearman.

HEAVY MANUAL WORKERS WITH CHARACTERISTIC MARKS

(1) *Collier.* A coal hewer commonly sustains minor injuries from flying pieces of coal. The pigment becomes tattooed into the skin and leaves permanent bluish scars which may be found on the hands or any part of the body.

(2) *Moulder.* Men in this trade mould sand into a wooden pattern. Shovelling the sand thickens the palmar skin, and packing it down with a rammer leads to the formation of a characteristic callosity on the ulnar side of the thumbs (Fig. 20A). The palms of the hands tend to become ingrained with

*Figure 19.**Figure 20.**Figure 21.**Figure 22.**Figure 23.**Figure 24.*

soiled sand. Identical markings are found on the hands of refractory moulders, head rammers, and core makers, as these occupations involve the same process.

(3) *Electrode Jointer*. He replaces the burned parts of the six foot long amorphous carbon electrodes used in an electric furnace. The hypo-thenar skin becomes roughened and impregnated with carbon. The skin of the remainder of the hand and fingers is affected similarly to a lesser degree. Both hands look alike (Fig. 21).

(4) *Cold Roller*. In this trade, strip steel is fed from a drum through a roller to reduce it to the requisite thickness. The steel has been treated in acid and sometimes in oily solutions, and these substances soften the hands and make them readily impregnated with dirt. The skin of the hands though soft is thickened. Contact with the metal makes the tips of the fingers smooth (Fig. 22A). The rough edges of the metal cut the hands deep enough to bleed. These cuts heal slowly. There is often a cut or a scar on the corsum of the left hand over the shaft of the first metacarpal inflicted during removal of the metal from the drums. The cuts generally, and particularly the one on the back of the left hand, are typical "cold roller's cuts" (Fig 22B and 23A).

(5) *Blacksmith*. There is nothing typical about the palms of the hands, but on the backs of the hands and on the forearms there are numerous small white scars. These are due to burns from hot fragments of scale.

(6) *Rolling Mill Workers*. All these men have very calloused hands, and ultimately the constant gripping makes the fingers permanently incapable of full extension. Their work varies, but many of the processes involve the use of tongs. The handles of the tongs cause a thickening of the hypothenar eminence or just radial to it (Fig. 24A), and further callosities at the root of the thumb (Fig. 24B), all along the radial side of the index finger, and on the adjacent side of the thumb (Fig. 25A). The



Figure 25.

precise situation of these, and their intensity, depends on how the tool is held and on whether the work is very heavy or not. If the handles of the tongs are held together by a steel ring, the friction of this against the index finger and thumb of the right hand cause great thickening of the skin.

Similar marks are found on the hands of other steel workers who use tongs, e.g., press tool workers, certain types of furnacemen, forgemen working under a steam hammer, tool hardeners, steel shearers, tilters, and reelers.

CONCLUSIONS

It is apparent from this inquiry that in any industrial area there are so many different occupations that it would be the work of a lifetime to make a comprehensive survey. The results of the investigation were disappointing in that so many workers bore no characteristic marks at all. It follows from this that the condition of the hands as a means of identification is only of limited application. I am convinced however that it might in selected cases, prove useful and its possibilities should be borne in mind.

I beg to acknowledge the help given to me by the officers and men of No. 3 Area of the National Fire Service and to express my gratitude to Detective-Sergeant Wallington, Detective-Sergeant Moore and Detective-Officer Carr of the City of Sheffield Police Photographic Department, who were responsible for the photographs.