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Building Tomorrow's Optometrists

The Eye, the Picture and the Second Opinion

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Introduction

The man in the chair has been asked to look at the little house at the end of the road inside the machine, and he is doing his best, and the machine has already finished. It has measured the shape of his eyes, produced a number for each of them, photographed the back of each one and made a note about the pressure, and it has done all of that in less time than it took him to take off his coat. When the optometrist comes into the room she is not starting an examination. She is arriving at the end of one, holding a folder of results that were assembled while her patient was still deciding where to put his umbrella.

That is the arrangement this volume is about, and it is different in kind from anything in the earlier books of this series. In most trades the machine arrived beside the work: a radiographer positions a body and a detector records it, a paramedic attaches a monitor and interprets what it says, a therapist writes a report that a transcription system drafts. In this trade the machine arrived in front of the work and, for a large part of it, became the work. The refraction that a practitioner once built by hand, lens by lens, in a darkened room, is now a by-product of a device the patient uses alone in a corridor. The look inside the eye, which required a dilated pupil, a steady hand and years of practice, is now a photograph that a technician takes and a clinician reads on a screen.

The trade has made its peace with this, mostly, and the peace is reasonable. Automated instruments are consistent, they are fast, they free the practitioner for the parts of the encounter that a device cannot do, and they have made a service available at a price that most households can reach without thinking about it. What the peace has cost is less visible and it is the subject of most of this book: the trade's practitioners now spend their days verifying measurements rather than making them, and a practitioner who verifies is in a different psychological position from one who measures, because verification invites the question of whether the number is right rather than the question of what the person in front of her needs.

There is a second difference, and it is commercial rather than technical, and the series has not encountered it before. This trade sells what it measures. The number that the machine produces at the start of the appointment becomes a pair of lenses at the end of it, and the practitioner's advice and the practice's revenue come out of the same mouth in the same conversation, which means that every clinical recommendation in this trade carries a trace of the till. Most practitioners manage this tension with integrity and no drama, and the ones who manage it badly do so in ways that are hard to see from

outside, and the arrangement itself is worth examining closely, because it is the arrangement almost every health system is drifting toward.

The instruments now arriving are a further step and they are the reason this volume exists. The photograph of the back of the eye is no longer only a photograph: a model reads it, grades it, and returns a result, and the result is usually that nothing is wrong. That word, usually, is where the trade's future is being decided. A practitioner who looks at a retina and says that it seems normal has made a judgement which she owns, which she can be asked about, and which she can revise when the person in front of her says something that does not fit. A model that returns normal has made a statement in the grammar of measurement, and the practitioner who accepts it has outsourced a judgement while retaining the responsibility for it, which is the least comfortable position a professional can occupy.

None of this makes the models wrong. Their sensitivity for the conditions they were trained on is genuinely high, and the volume says so plainly, because a book that treated every instrument as a threat would be as useless as one that treated every instrument as progress. What the book argues is narrower and harder: that the trade's product is a decision about whether to look again, and that a system which is usually right and never uncertain is a system that quietly removes the reason to look again. The cost of that removal does not appear in any accuracy figure and it appears in every practice, once or twice a year, as a person who was told that everything was fine.

This is the ninety-eighth volume of a series about trades being rebuilt around machines, and it follows the same architecture as the others: what the trade is, the stories told about it, the routes in, the working day, the rules of the craft, the churn, the rooms where the decision is really made, the instruments, a constructed year, and the long view. Three constraints run through it. No figures appear in the body, because every threshold, interval and prescription in this trade is jurisdictional and most of them expire within an edition. No service, regulator, employer, device or manufacturer is named, because a book that named them would be a book about a market rather than about a craft. And every person, practice and case is constructed for the chapter in which it appears, including the practice whose year occupies the ninth chapter, which carries a note in its first paragraph saying it was made for this book.

The question this volume keeps returning to is not whether the machine can see the eye. It plainly can, and in some respects it sees it more consistently

than a tired practitioner at the end of a Saturday. The question is what the trade is for once the picture exists, and the answer the book arrives at is unglamorous and, I think, correct: the trade is for the second opinion, the one that is not a repetition of the first, and for the conversation in which a person is told what the picture means for the years she has left. A machine that grades an image has not had that conversation and will not be having it. Somebody has to, in eight minutes, in a room with a window, while the next patient is already in the chair.

A word about the shape of the argument, since this book makes a claim that is easy to misread. It does not say that automation is bad, that practitioners were better in some earlier decade, or that a photograph is inferior to a hand-held lens for the purposes of finding disease. On the evidence, the machine finds more than the practitioner does, more consistently, at three in the morning and at twenty past five, and a volume that denied this would be defending a romance rather than a craft. What the book says is narrower and less comfortable: that the trade's clinical value lies in a second look, that a second look only happens when somebody believes it is worth taking, and that a system which returns a confident normal result removes the belief while leaving the responsibility intact.

That claim has consequences which run through the chapters in a fixed order. The trade's identity has to be re-established because the two stories the public holds both survive automation without difficulty, and neither of them requires a practitioner who decides anything. The routes into the trade have to be re-examined because a student who trains on instruments will not acquire the skills that make a second look possible, and the debt she takes on will ensure she works at the pace the debt requires. The working day has to be described honestly because the eight minutes are where the argument is actually settled, and a craft that cannot survive eight minutes is not a craft. The rules have to be stated because they are what a practitioner does instead of trusting a report. The churn has to be read plainly because the people who would notice a degradation are the people who leave quietly. The rooms have to be visited because the trade is several services and only one of them is being industrialised. The instruments have to be understood because a device that gives opinions rather than measurements is a new category. And the constructed year has to be walked through because the argument is not visible in a policy document and is entirely visible in a January.

The series has made this journey before, in trades where the machine arrived

as a colleague, and this volume marks the point where it arrives as a substitute for the part of the work that practitioners most valued. That is why the book ends where it does, with a question rather than a forecast.

The reader who wants the argument in a paragraph can have it here and should still read the chapters, because the argument is not the book. A trade that measures eyes has become a trade that reads reports about eyes, and the change happened so gradually and so reasonably that nobody in the trade can point to the year it occurred. The reports are accurate, which is why objecting to them sounds like objecting to evidence, and the accuracy is beside the point, because the trade's value was never in the measurement. It was in the second look, taken by somebody who had looked at the eye, on the suspicion that the first look was not enough. Everything in this volume follows from the observation that a system which returns normal has no reason to prompt a second look, and that the practitioner receiving it has been left responsible for a judgement she no longer has the means to make.

That is why the book spends as much time on rooms, leases, appointment intervals and inspection regimes as it does on instruments. The argument is not technical and cannot be settled by a study, because it concerns what a profession is for and who decides. A trade can be accurate and useless, and it can be inaccurate and indispensable, and no measurement distinguishes the two.

A note on what this volume asks of its reader. It assumes no clinical knowledge and describes no technique in detail, because technique is learned with a patient present and not from a book. What it does assume is that the reader has either been examined, examined somebody, or wondered what happens in the eight minutes behind a shop window, and it argues that all three positions are the same question asked from different sides: whether the person who looked at the eye was doing something that the picture of the eye could not.

The volume is written in the order a practitioner would recognise rather than the order a policy document would use: identity first, then the stories, then the routes, then the day, then the rules, then the people, then the rooms, then the instruments, then one year, then the question. A reader in a hurry can take chapter five and chapter nine and will have the argument. A reader who wants to understand why the trade is where it is should read chapter three first, because the debt taken on before the first patient explains more of the trade's behaviour than any clinical consideration.

Chapter 1: The Trade That Reads Pictures

The caricature arrives first because it is the one the public meets. An optometrist, in this picture, is a person in a white coat who asks which is clearer, one or two, and who then walks you to a wall of frames and discusses the price of the second pair at half. The caricature is not a slander invented by enemies; it is a fair description of a large part of the commercial surface of the trade, and every practitioner has had the experience of being introduced at a party as the person who sells glasses and has decided, for reasons of energy, not to correct it.

The second caricature is the flattering one and it is held by people who know a little more. The optometrist, in this picture, is the frontline detector, the clinician who looks inside the eye and catches the disease that nobody else would have found, the quiet hero of the high street whose photograph saves a life every few months. This one is also partly true, and it is more misleading than the first, because it locates the trade's value in the rare dramatic find rather than in the ordinary work that fills the day, and a trade that believes its own legend will spend its attention on the wrong part of the examination.

The trade itself is neither. It is a discipline of optical correction and ocular health in which the practitioner's actual product is a decision, made repeatedly, in a short space of time, about whether the person in front of her needs anything. Most of those decisions are no. The eye is normal, the prescription has changed a little, the wearer is managing well, come back in a year. A practitioner who makes a hundred of those decisions in a week and gets ninety-nine of them right has done her job, and if she is unlucky the one she got wrong will be the only one anybody remembers.

That asymmetry is the structural fact of the trade and it explains most of its behaviour. The correct answer is usually nothing, the incorrect answer is occasionally catastrophic, and the two facts pull in opposite directions: toward speed, because nothing is usually wrong and there is a queue, and toward caution, because the cost of the rare miss is enormous and lands entirely on the practitioner. Every practice resolves that tension differently, and the resolution is visible from the waiting room. Some practices resolve it by building in time for a second look, which is expensive and shows up as a shorter appointment list. Others resolve it by trusting the instruments, which is cheap and shows up as a shorter appointment.

What makes this trade distinctive in the series is that the instrument now produces the finding rather than confirming it. A radiographer's image requires

interpretation by a person who was trained to interpret it, and the machine that took the image has no opinion about what it means. In this trade the device that measures the eye also assesses the picture, and the assessment is delivered in the same folder as the measurement, in language that reads as a result rather than as an opinion. The practitioner opens the folder and finds that the work of looking has already been done, competently, in a vocabulary she did not choose.

The trade's response to this has been sensible and incomplete. Sensible, because the alternative is to refuse instruments that are faster and more consistent than a hand and to spend the appointment doing things worse than they can be done. Incomplete, because the skills that the instruments replaced were also the skills that produced the practitioner's ownership of the finding, and ownership is not restored by reading the instrument's output carefully. A person who has never built a refraction from nothing does not know which parts of the number are robust and which are the device's guess, and a person who has never scanned a retina with a handheld lens does not know what a photograph flattens.

So the definition this book works with is deliberately awkward. The trade is the practice of deciding, on the basis of measurement and picture and conversation, whether a person's eyes require anything today, and of explaining that decision in a way the person can act on. The measurement is now mostly automatic, the picture is now mostly machine-graded, and the decision and the explanation are the parts that have not been automated and are not close to being automated, which means the trade's future is entirely in the parts that a business cannot easily count. That is an uncomfortable place for a profession that has spent forty years being paid for the measurable part.

Consider what the trade asks of a practitioner in a single appointment, in the order the appointment actually happens. She must establish what the person has come for, which is often not what the appointment was booked for. She must accept or reject a measurement produced by a device that was calibrated this morning by somebody she has never met. She must look at a picture of a place she cannot touch and decide whether the small thing at the edge of it is an artefact or a disease. She must decide whether the change since last year is a change or a difference in how the measurement was taken. She must then translate all of that into a recommendation that includes a price, and do it in a way that leaves the person feeling advised rather than sold to. Nothing in that sequence is unavailable to a machine except the last

part and the judgements that depend on knowing the person.

The trade's own institutions have understood this unevenly. Training still spends a great deal of time on the optics and the pathology, which are the parts that make the judgements possible, and comparatively little on the conversation that delivers them, which is the part the person actually experiences. A new practitioner therefore enters practice well equipped to know what is wrong with an eye and poorly equipped to say so to a frightened person in a room with a wall of frames behind her. The gap is filled by temperament, and temperament is not a curriculum.

There is a version of this trade's future in which it becomes a clinical service that happens to sell, and a version in which it becomes a shop with a clinical annex. The two are indistinguishable from the street and entirely different from the inside, and which one a practice becomes is decided by small choices about what gets counted. A practice that counts pairs sold will get one behaviour and a practice that counts second looks will get another, and the instruments arriving now make the first far easier to count than the second. That is where the next nine chapters are going, and it is why the trade is worth a volume of its own rather than a chapter in one about eyes.

The trade's four decisions are worth setting out plainly, because everything later in the volume refers back to them. The first is whether the person needs a correction, which is a question the instruments answer well and which occupies a surprising share of the public's idea of the trade. The second is whether the correction has changed enough to matter, which is a question about the person's life rather than about the number, since a change that is trivial for a lorry driver is significant for a jeweller and both of them will be shown the same figure. The third is whether the eye itself is well, which is the question the photograph was meant to answer and which the photograph answers only within the frame it captured. The fourth is what to do next, and it is the only one of the four that the practitioner owns entirely, because it requires knowing what the person in front of her can afford, tolerate, understand and return for.

Those four decisions are made in a sequence that takes minutes, in a room that is also a shop, by a practitioner who may have met the person for the first time ninety seconds earlier. A trade that made only the first decision would be a technician's job and could be fully automated. A trade that made only the third would be a screening service and would be funded differently. It is the presence of all four, in one room, in one appointment, that makes the trade

difficult to describe and difficult to replace, and it is the reason a practitioner's bad day is not a day of missed diagnoses but a day of decisions made too quickly in a room where there was no time to make them properly.

What the trade is not is equally important. It is not a specialty of medicine, though it borrows medicine's vocabulary and its instruments, and the borrowing causes a specific confusion in which patients attribute to the practitioner an authority to treat that the practitioner may not have. It is not a retail trade, though a large part of its revenue comes from selling, and the pretence that the retail part is incidental has done the profession no favours in public argument. And it is not a screening programme, though it performs screening, because a screening programme has a defined population, a defined test, a defined interval and a defined pathway for the positive result, and most of this trade's screening happens opportunistically in a shop with no pathway except the practitioner's own address book.

The nearest comparison in the series is radiography, and the comparison is instructive precisely because it fails. A radiographer receives a request, positions a patient, acquires an image and hands it to somebody else to interpret, and the discipline of the trade lies in acquisition and in the judgement about whether the image is good enough to answer the question asked. An optometrist acquires her own images, interprets them herself, decides what they mean for this person and then talks about money in the same encounter, and the discipline of her trade lies in holding four dissimilar tasks in one conversation without dropping any of them. Radiography industrialised by splitting the tasks across people. Optometry industrialised by giving the first task to a machine and hoping the practitioner's attention would be freed for the others, which it was not, because the freed time was immediately sold.

There is a version of this history that practitioners tell each other and it is worth recording because it shapes how they behave. In that version, the trade was once respected, the examination took an hour, the practitioner knew the family, and the whole thing was ruined by the multiples who made it free and fast and turned a profession into a counter. The story is partly true and it is mostly useless, because the multiples did not invent the demand for cheap spectacles and could not have built it without a public that wanted them, and because the hour-long examination the story remembers was available to a small number of people in a small number of towns. What the story does record accurately is a change in the practitioner's standing inside her own

room, from the person who produced the finding to the person who confirms it, and that change is real, is recent, and is the subject of the rest of this book.

The trade's vocabulary is the first thing that has to be fixed, because the words people use about this work decide what they expect from it. The public calls the appointment a test, which implies a result that is either passed or failed, and a test is a thing you can have done to you rather than something you participate in. Practitioners call it an examination, which implies a body of knowledge applied to a person, and the word is more accurate and is not one that a customer would use about her own eyes. The paperwork calls it a sight test, which is a commercial formulation invented to make the service sound quick and cheap, and it has succeeded so completely that practitioners now use it about their own work in the same breath as complaining that nobody respects it.

The words inside the trade are equally revealing. A refraction is both the measurement and the act of measuring and the discussion of the result, which means a practitioner has no way of distinguishing between the machine's number and her own judgement when she describes her day. A grade is a category produced by a scheme, and the trade borrowed the word from screening programmes because it sounded rigorous, and it now has practitioners saying that an image was graded normal in the way one would say that a person was pronounced healthy. And a recall is a commercial term that has entirely replaced the older idea of a review, which at least implied somebody reading something again.

The consequence of this vocabulary is not trivial, because a trade that cannot name the difference between its measurements and its judgements will not defend the judgements when they are questioned. A practitioner in a hearing is asked why she did not refer a patient, and if her own account of her work has been a sequence of measurements and grades, she will answer in that language and will sound like an operator of equipment. A practitioner whose vocabulary separates what the device reported from what she concluded can answer the same question in one sentence, and the sentence will end the matter, because it describes a clinician exercising judgement rather than a technician reading output.

There is a commercial reason the vocabulary drifted and the volume should name it without moralising. A trade that describes itself in the language of measurement can sell its service cheaply and at scale, and a trade that describes itself in the language of judgement has to charge for time, and time

is the thing customers resist paying for. The drift was therefore adopted by the trade's own institutions because it made the service accessible, and accessibility is a genuine public good, and the price of it was a public that believes it is buying a measurement. That price is being collected now, in the era of the model, because a public that believes it is buying a measurement will reasonably ask why a person is involved at all.

The comparison with dispensing opticians is worth a sentence because it shows what happens when a trade gives the vocabulary away entirely. The dispensing side of the optical world is a craft of its own: a knowledge of lenses, frames, faces and tolerances that produces the difference between spectacles that work and spectacles that are tolerated. It is described by the public as shopping, it is paid as shopping, and its practitioners have spent a generation trying to explain that what they do is technical. The examining side of the trade is on the same road with a decade's head start, and the instruments are accelerating the journey, and the profession's response has been to talk about standards rather than about what it is selling.

The trade's own defence, stated in the plainest terms available, is that a measurement without a judgement is dangerous in a way that no amount of accuracy can fix. A perfectly measured eye in a person whose disc is abnormal is a patient who has been measured and not examined. A perfectly graded image of a field the camera did not fully capture is a report that says normal about a place nobody looked. The public does not need to understand optics to understand that distinction, and the trade has never made the argument in public with any force, which is one reason the vocabulary of the shop has won.

The chapter's conclusion is therefore about ownership rather than about status. The trade will keep its instruments and should. What it must not lose is the sentence that follows the instrument's output, which is the practitioner's sentence and belongs to nobody else: I have looked at the eye as well as at the picture, and here is what I think, and here is what I want you to do about it. A practitioner who can say that has a trade. A practitioner who cannot is providing a service that a device with a maintenance contract will eventually provide more cheaply, and the fact that it will do so accurately is not a defence and is the whole of the problem.

The ownership of the finding is the last idea in this chapter and it is the one the trade has never settled. In law and in custom, the practitioner who performs an examination owns what she concludes, and ownership means she can be asked to defend it. When an instrument concludes instead, the

practitioner's ownership does not disappear: it is transferred to her without her consent, and she is left responsible for a judgement she did not make and, in the ordinary case, did not read carefully because it arrived as a result. The trade has not built a habit that would make this safe, and the habit it needs is unglamorous: read the output as a claim rather than a result, and decide whether you would have said the same thing having looked.

The comparison that closes this chapter is not with a machine but with a form of practice the trade already runs well, which is contact lens work. A practitioner fitting a lens measures, tries, watches the eye respond, changes a parameter and teaches the person to manage the thing, and no part of that sequence can be handed to a device because the surface answers back. The trade has never tried to automate it and would not want to. If the ordinary examination were treated with the same seriousness, the photograph would be a starting point rather than a result, and the practitioner would spend her minutes on the part that answers back, which in an eye examination is the person rather than the tissue.

A trade, in the sense this series uses the word, is a body of judgement that a group of people agree to be accountable for. The agreement is what distinguishes a trade from a service: a service is measured by whether the customer was satisfied, and a trade is measured by whether the practitioner's judgement was sound, which are different questions and come apart precisely when the customer is happy and the judgement was wrong. This trade has spent forty years being described as a service and has organised itself accordingly, and the instruments arriving now make the service version cheaper to run and the trade version harder to defend, which is the tension the whole volume describes.

A final observation about the trade's self-description, which is that it has no word for the moment the examination becomes clinical. Other trades have names for the shift: the diagnosis, the call, the finding. In this trade the shift happens quietly, when a routine appointment stops being routine, and the practitioner must make it visible to the person in the chair without alarming her and without pretending nothing has changed. The skill of that moment is the trade's real craft and the profession has never named it, which is one reason the public believes the appointment is a measurement and the practitioner believes she is being paid for one.

What this chapter has established is narrow and it is enough for the nine that follow. The trade's product is a decision about whether a person needs

anything today. The measurement of that decision's inputs has been automated, competently and irreversibly. The decision itself depends on a second look, which happens only if somebody believes it is warranted, and the receipts the trade now receives are phrased in a way that removes the reason to believe it. Everything else in this volume is a consequence of that arrangement, worked out in rooms, routes, rotas and leases.

ABOUT THE AUTHOR

Aiman JoeHanz writes about work: the trades that hold institutions together, the people who do them, and what happens to a craft when the clerical and measuring layers around it are given to a machine.

Building Tomorrow's People is his series on the professions a society depends on, each volume written from inside a working day rather than from a policy document. The series runs past ninety volumes, from engineers and statisticians through paramedics, radiographers, occupational therapists, speech-language therapists and midwives, and it reaches optometry at the point where the machine stopped assisting the examination and started performing it.

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