

**Data and the Development of Research Methods in the  
Science of Human Emotional Expression from Darwin to  
Klineberg**

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## Abstract

The science of emotional expression was opened up by Charles Darwin in *The Expression of the Emotions in Man and Animals* (1872). It proposes three principles to explain the mechanisms of expressive behaviours through six research methods. This thesis offers the first detailed examination of three of the new methods of data collection that Darwin introduced in the book, and uses that examination to explore the relations between Darwin's theories and data as well as the afterlives of his methods in American psychology in the first half of the twentieth century. The three methods are the questionnaire, the recognition experiments on photographed expressions and the newly discovered literary approach. The original data of the questionnaire avails the first discussion of Darwin's publication bias, finding that in order to produce the conclusion on racial unity, Darwin had silently dropped one of the questions from the original questionnaire and hidden a significant body of data about racial distinctions. Apart from this pursuit of racial universality, another ultimate conclusion & presumed hypothesis in the book is discovered: the evolution of expression from animals to human, concerned with the recognition experiments. With the last method, we find that when there lacked observational evidence for some expressions, Darwin often quoted works of fiction as supplementary data. The use of these Darwinian methods in the field of psychology is then historically tracked. Two American psychologists – Antoinette Feleky and Otto Klineberg – are cited as the prominent users of recognition experiments and the literary approach respectively. With historical and sometimes quantitative analysis of their original data, the research uncovers reasons for the prosperity of the recognition experiments and the decline of the literary approach in that period; and demonstrates the ideological transition in the expressional science: from physiological doctrine to the purely psychological approach with more cultural concerns.

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## **List of Abbreviations and Acronyms**

APS: American Philosophical Society Digital Library

CRP: Regional Council of Psychology

CUL: Cambridge University Library

DCP: Darwin Correspondence Project

FACS: Facial Action Coding System

NMM: National Media Mus

## **Introduction**

Charles Darwin's renown and influence as a figure in the history of science – both within academia and the public consciousness – is mainly derived from his biological works, such as the *Origin of Species* (1859) and the *Descent of Man* (1871). In contrast, much less attention has been paid to Darwin's psychological writing, specifically *The Expression of the Emotions in Man and Animals* (1872) (referred to hereafter as the *Expression of Emotions*). Nonetheless, the science of emotional expression was an important development in scientific thinking, and so should be counted as one of Darwin's significant contributions to scientific endeavour. In the first three chapters of the *Expression of Emotions* Darwin proposes three principles: Principle 1 that 'Serviceable Associated Habits' can be inherited; Principle 2 that 'Antithesis' expression will occur under antithesis emotion; and Principle 3 that Some expressions are 'direct action of the nervous system' (Darwin 1872: 28–29). In the *Introduction* of the book Darwin also lists six research methods utilised for the study: Method 1 Observe infants, Method 2 Observe psychopaths, Method 3 Recognition experiment, Method 4 Observe artworks, Method 5 Questionnaire and Method 6 Observe animals. It is an interesting fact that Darwin does not associate any of the six methods with the three principles that are the core findings of the book. Information on how the principles were formulated is not articulated in the book, neither is their linkage with the six research methods. This problem has received so little attention as to almost remain a blank in the standard history of Darwin's work. Moreover, in later psychology, only some of the methods that Darwin espoused here were carried forward, whilst the others were largely dropped. These problems pushed me to think about the history of the three principles in Darwin's thought, and what made the difference between the adoption of the research methods that Darwin used in this work. To solve these problems, we need to contextualize the principles in the school of Darwin and to track the developments of Darwinian methods used by Darwin and after him. To achieve this, the following literature has been consulted.

### **1 Scholarship on Darwin and the *Expression of Emotions***

#### *1.1 On narrowing the study field*

The first book I read in this area was Thomas Dixon's *From passions to emotions: the creation of a secular psychological category* (2003). It provides a general history of progressive views on passions and emotions from as early as Augustine and Aquinas up to Charles Darwin and until William James, who are separately introduced in each

chapter. However, the links between the chapters are very weak. The book does not acknowledge the influences of predecessors on Darwin's principles, rather viewing them as independent research. The core question raised by Dixon is when and how Darwin's predecessors started to use the word *emotion* instead of *passion* and *sentiment* when referring to mental behaviours. After reading this, I turn to examine Darwin's own work on emotion in the *Expression of Emotions*. A surprising finding I made here was that, throughout the entire book, there is only one footnote about the concept of emotion, which cites Herbert Spencer: 'Spencer has drawn [a] clear distinction between emotions and sensations, the latter being "generated in our corporeal framework". He classes as Feelings both emotions and sensations' (Darwin 1872: 27). Apart from this ambiguous and indirect definition of emotion cited from Spencer, Darwin never gives any space to actually discussing the basic notions of the two subjects in the book title – the emotions and their expression – and none of the previous philosophers who phrased or discussed these notions is cited in the book. The real focus of Darwin's research is on the external manifestation of emotion: the expressive behaviours. This fact can explain why Dixon's (2003) attempt to contextualize Darwin in the wording and conceptual history of emotion proves ineffective. Dixon's book is representative of those who only look at the principles without examining Darwin's expressional study as a whole. After reading Darwin's work, I then turned to reading the scholarship on Darwin's research methods.

The second book that further narrowed my field of study was written by the famous psychologist Paul Ekman to commemorate the 100th anniversary of the publication of the *Expression of Emotions: Darwin and Facial Expression: A Century of Research in Review* (1973) (*Review* for short). It reviews a century of research on emotional expression that utilizes Darwinian methods, and categorizes these into the fields of the facial expression of emotion in nonhuman primates (Darwin's Method 6), infants and children (Method 1), recognition experiments (Method 3) and cross-cultural studies (Method 5). Ekman's (1973) review of the century of studies reveals the developmental disparity between Darwinian methods, which is that, apart from the studies of animal and infant expressions now integrated into the modern sciences of Comparative and Developmental Psychology, the only method still alive in the study of expression is the recognition experiment (Method 3). However, as a scientist rather than a historian, Ekman's introduction of this method only cares about relating it to the most contemporary findings of his time, with the research in the time between Darwin and the early decades of the Twentieth Century receiving little attention. Second, out of the four methods discussed, Ekman only considers Darwin's observations of animal and infant expressions (Method 6 and 1), ignoring his use of the other methods. Third, Ekman mentions the literary study of expression by Klineberg (1938), but neither of

them mentions that Darwin also cites a lot non-scientific literature on emotional expression, including works of fiction, such as Shakespeare, poems, the Bible, and so on. This method – let us call it the literary approach – was more often used by Darwin than some of the methods on the list, such as Method 4: Observing artworks, which was scarcely utilised. Finally, like Dixon (2003), Ekman does not consider the connection between Darwin’s principles and research methods. To fill this vacuum, Darwin’s use of some of the methods must be carefully examined by tracking his working process: from data collection and data analysis through to his data publication and conclusion making. Since Methods 1 and 6 have been studied by Ekman (1973) and Method 4 was rarely used, the focus here will be on Method 3: Recognition experiments, Method 5: The questionnaire and Method 8<sup>1</sup>: The literary approach. Darwin first used these three methods in the study of expression, but only Method 3 and Method 8 have been carried forward by subsequent scholars. Their development until the 1940s – something that has not previously been historically researched – will be studied to see what caused the differences between them. In contrast to Dixon’s and Ekman’s books, which cover the whole period in only a general way, I would like to highlight the works of a select number of psychologists that made the most novel contributions at this time.

### *1.2 Scholarship on Darwin and the Expression of Emotions*

Now that the aims of the whole thesis have been outlined, we can turn to look at the first problem: the history of the principles in Darwin’s thought and his predecessors’ influences on them. The most systematic research in this area has been carried out by W. Montgomery (1985) in a book chapter entitled ‘Charles Darwin’s thought on expressive mechanisms in evolution’. As the title suggests, Montgomery believes that the three principles are three expressive mechanisms. The first and third principles can be easily understood: that the ‘Serviceable Associated Habit’ is about the inheritance and evolution mechanism; and the ‘Direct Action of the Nervous System’ is about the mechanism of the nervous system. However, Montgomery (1985), Dixon (2003) and Ekman (1973) are in agreement about the unacceptability of the second principle – ‘Antithesis’ – a position that has never been treated as being scientifically plausible. The second principle has certainly received the most criticism and scepticism of the three, but the critics just repeat the same argument in critiquing it: that according to modern science, or from their points of view, it is wrong. However, the reasons why Darwin considered it to be correct have not often been considered. With historical insight, Montgomery (1985) was one of the first to locate the word ‘antitheses’ in Darwin’s 1838 Notebook M. However, Montgomery equates the note about a

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<sup>1</sup> There is another method introduced in Section 4 below.

particular observation of antithetical expression with the matured form of the second principle. As Rudwick (1982) suggests, ‘in keeping with his strong theoretical interests, Darwin usually developed the rudiments of a theory first but then spent years collecting evidence and working out the implications of the idea’. What we really want to know is how the principle was steadily built up between 1838 and 1872, and this important information is missing from the extant literature. With the first principle, Montgomery finds the middle word, ‘association’, in Darwin’s grandfather Erasmus’s writing – the *Zoonomia* (1794) – and thus claims that this book had a huge influence on the formation of the first principle. Nonetheless, this claim does not fit well with the fact that Darwin does not acknowledge Erasmus in the *Expression of Emotions*. In contrast, the people who contributed to the other keywords of the principle – the ‘serviceable’ and ‘habit’ – are both acknowledged. Since the ‘serviceable’ has been completely overlooked by Montgomery, and his explanation of ‘habit’ is not conclusive, Chapter 1 of this thesis will analyse the history of these theoretical constructs in Darwin’s thought.

In relation to Darwin’s third principle, the theories of the nervous system are all quoted directly from physiologists, such as Herbert Spencer and Johannes Müller. Moreover, throughout the book, Darwin relies heavily on the anatomical discussions and muscular diagrams provided by Charles Bell, Jakob Henle and G. B. Duchenne. As acknowledged in the *Expression of Emotions*, the pre-Darwinian research on facial expression can be largely divided into two eras. The first is the Era of Physiognomy from Aristotle through to J. C. Lavater in the late Eighteenth Century. Those physiognomists attempted to read people’s temperament from their facial features<sup>2</sup>. In the early Nineteenth Century, the old tradition of physiognomy was finally replaced through new achievements in human anatomy. The anatomists and physiologists studied physical features only, without the ideology of linking them with people’s personalities. The Era of Human Anatomy<sup>3</sup> started with the great work of Charles Bell on expression: *The Anatomy and Philosophy of Expression*<sup>4</sup> (referred to hereafter as the *Anatomy of Expression*). Although these achievements in physiognomy and anatomy are both acknowledged in the *Expression of Emotions*, Darwin’s attitudes towards the two are quite different. He refers to the anatomic atlas of Henle and Bell when discussing the expressive movements of facial muscles, but considers physiognomy as unscientific and untrustworthy<sup>5</sup>. Of all the scientific contributors, Charles Bell has received the most attention in previous scholarship (e.g. Montgomery,

<sup>2</sup> For an introduction to the Era of Physiognomy and Lavater’s writings, see Graham (1961).

<sup>3</sup> For an introduction to this period, see Dixon (2003).

<sup>4</sup> This was first published in 1806, while its third edition in 1844 was the text used by Darwin.

<sup>5</sup> The Era of Physiognomy is regarded by Darwin as the preparatory stage of the second era: physiognomy led the anatomists/physicians more deeply researching the facial musculature of human beings.



1985; Prodger, 2009), but Bell's exact influence on Darwin's expressional study and the reason for Darwin's heavy reliance on secondary sources when discussing anatomical problems have not yet been explained. With historical insight, I will thus turn to look at Darwin's autobiography and archives. First, I know that Darwin came to know Bell's work on expression when he was studying medicine at Edinburgh University. His first-year curricula, which he began in October 1825, included medicine, chemistry and anatomy<sup>6</sup>. However, as Darwin wrote in his autobiography, 'Dr. Munro made his lectures on human anatomy as dull, as he was himself, and the subject disgusted me. It has proved one of the greatest evils in my life that I was not urged to practice dissection, for I should soon have got over my disgust; and the practice would have been invaluable for all my future work' (1958: 47). The 'future work' mentioned undoubtedly included his later study of expression. Despite the dull lectures on anatomy, Edinburgh University still provided the naturalist with maybe the earliest enlightenment in his thought on expression. In 1826 Darwin joined the Plinian Society<sup>7</sup> and became a zealous attendee at their regular meetings. From the meeting records, we know that two other members, William Browne<sup>8</sup> (1805–1885) and William Greg<sup>9</sup> (1809–1881), had announced similar objections to Charles Bell's creationist view on expression in front of Darwin (Desmond and Moore 1991: 32–33). In the *Expression of Emotions*, Darwin expresses the same opposition to Bell's belief in the superiority of human kinds and the argument that some of our muscles are specially created for expressing emotions, but the two fellow members are not mentioned. William Browne's son, James Crichton-Browne (1840–1938), later became the primary assistant to Darwin for conducting Method 2: Observe psychopaths, though he was not recommended by his father<sup>10</sup>.

Apart from Darwin's lack of background knowledge in anatomical practices and the early enlightenment he received through the Plinian Society, the final thing learned from Darwinian biographies that may be relevant to the achievements in the *Expression of Emotions* is that of the antiracist attitudes within Darwin's family. As we know, after the first three chapters articulating the three principles, Chapter IV and V describe animal expressions, and the following chapters (Chapters VI to XIII) are

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<sup>6</sup> For more information on Darwin's study at Edinburgh, see Radick (2009).

<sup>7</sup> The society was founded by John Baird in 1823. The early members included Darwin's tutors, Robert Jameson and Robert Edmund Grant. For Darwin's description of the Plinian Society and notes on their discussions, see Darwin (1958); Browne (1995).

<sup>8</sup> William Browne was one of the most significant asylum doctors and a reformer in the Nineteenth Century.

<sup>9</sup> Greg later became a member of the Metaphysical Society and also published essays on agriculture and the Corn Laws.

<sup>10</sup> On the observation of 'the insane', Darwin at first applied to physician Dr. Maudsley, who provided him with an introduction to Crichton-Browne (Darwin 1872: 13). Darwin's contacts with Crichton-Browne will be introduced in Chapter 3.

about human expressions. In the human chapters, Darwin quotes many observations about distant races from the global answers to his questionnaire (Method 5). As Ekman (1973) points out, Darwin's discussions of those observations always have the same conclusion: that unity of expression exists among different human races. This conclusion, however, has nothing to do with any of the three principles. That is, Method 5 and the final eight chapters of the *Expression of Emotions* are used to argue for racial unity rather than for any of the three principles. This seems to indicate that racial unity and the three principles may be parallel conclusions in Darwin's expressional study. Before we enter into a deeper discussion of Darwin's methodology below, it is worth noting that some inspiration about this problem can still be gleaned from the more generalistic Darwinian biographies. Desmond and Moore (2009) contend that Darwin's commitment to racial unity derived from a family tradition that can be traced back to both his grandfathers. We are told that there was a strong antislavery and antiracist outlook in the Darwin-Wedgewood family, with Darwin's father, Robert, and both grandfathers, Erasmus and Josiah Wedgewood, being slavery abolitionists. As a potter, Wedgewood produced a famous medallion inscribed with the words 'Am I Not a Man and a Brother?'<sup>11</sup> to call attention to the antiracism and anti-slavery campaign in 1787.<sup>12</sup> Desmond and Moore (2009) thus claim that Darwin's commitment to racial unity derived from this family outlook, and existed before his publications or scholarly life began<sup>13</sup>.

The above information from historical scholarship is serviceable for our study here. However, we have to confront the same problem that has perplexed most scientific historians: how to incorporate these scattered historical findings into one chapter that provides a suitable introduction to Darwin's intact and scientific book, the *Expression of Emotions*. The clue to solving this problem is provided by Darwin's scientific method. Many scientists and historians, including Ghiselin (1969); Mayr (1988); Eldredge (2005); and Ayala (2009), believe that Darwin's research was characteristic of the hypothetico-deductive methodology. Their argument is based on the historical fact that Darwin first formulated the idea of natural selection in 1838. On this basis they claim that, from 1838 until the end of his life, Darwin 'relentlessly pursued empirical evidence to corroborate the evolutionary origin of organisms and to test his theory of natural selection' (Ayala 2009: 10033). The use of the deductive method in the *Expression of Emotions* is taken for granted by Ekman (1973: 145), but without supportive evidence. However, using Ayala's (2009) suggestion that, 'nowadays also,

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<sup>11</sup> This has been credited as the most famous image of a black person from all the artwork of the Eighteenth Century. See Bruns (1977).

<sup>12</sup> For more information on this campaign and the Darwin-Wedgewood family's contribution to it, see Bindman (1994); Hamilton (2008).

<sup>13</sup> For similar arguments, see Radick (2008); Hayward (2013).

scientists, young or old, often report their work so as to make their hypothesis appear as afterthoughts, conclusions derived from the observations or experiments made, rather than as preconceptions tested by empirical observations...’ (p. 10034), it is possible to locate Darwin’s ultimate conclusions as also being his hypotheses, written at the end of the book. There are two hypotheses in Darwin’s expressional study: that human expressions are derived from those of lower animals and that there exists a unity of expression between human races (Darwin 1872: 367). Method 5: The questionnaire was specially designed to collect observations of distant races to collaborate the second hypothesis on racial unity. However, the pursuit of such uniformity may have shaped Darwin’s handling of data, in that he only reported evidence supporting the hypothesis and neglected evidence opposing it. Chapter 2, by comparing the global answers in the correspondence with the published testimonies in the *Expression of Emotions*, finds that a larger number of negative data had been discarded. Furthermore, a questioned expression that had received the most negative answers on its uniformity was simply deleted from the original questionnaire. By these means, Darwin always reaches an identical conclusion: that ‘the same state of mind is expressed throughout the world with remarkable uniformity’ (Darwin 1872: 17).

This sharp contrast between the discarded data and this conclusion inspires me to investigate the influences of presumed hypotheses on Darwin’s use of the other methods – the recognition experiments and the literary approach – in Chapter 3. Moreover, the hypothetico-deductive model is also helpful for tracking the progressive use of these methods in later scientific investigations and writings in this area. The comparatively limited research that utilized these methods before the 1940s allows us to conduct in-depth examinations of the works of these scientists. The research of the second recognition experimenter – American psychologist Antoinette Feleky – which was undertaken during the 1920s will be explored in Chapter 4, and will be compared to Samuel Fernberger’s tests on false human faces (the facial model) from the same decade. Their scientific practices in psychology are contextualized in the general development of facial studies. Up until now, Otto Klineberg may be the only psychologist who has studied expression simply through reading and engaging with the extant literature. His research will be introduced in Chapter 5, in relation to contemporary social and intellectual backgrounds. At the end of the thesis, we will see that, first, in scholarship using the same method, the hypotheses, research subjects and designs of the tests evolved independently; and, second, that these methods were mutually supportive and integrated. Reanalyzing historical data and research methods is not a new approach in studies of History and Philosophy of Science (HPS), but my methods and purposes are slightly different from those of the existing scholarship, as I will explain below.

## **2 HPS scholarship on data collection and analysis**

The existing scholarship looking at historical data can be classified into three types. The first challenges the objectivity of scientific publications, and the most famous discourse on this problem may be the Fisher-Mendel controversy. Ronald Fisher (1936) questions the accuracy of Mendel's statistics, claiming that the results are too good to be true. Similarly, Stephen Jay Gould in the *Mismeasure of Man* (1996) challenges the data that are reported by antecedent scientists. Both of them utilize statistics in their research. The second type is that seen in Simon Shaffer's (2009) and William Harper's (2011) work. They think that by looking at Newton's sources of data we can get a better understanding of the political and economic environments of his time. Similarly, Gregory Radick in *The Simian Tongue* (2007) proposes that Darwin's sources of data are helpful for grasping the social and cultural surroundings in Africa during Darwin's time of writing. The third type is seen in the approach adopted by David Sepkoski (2005; 2009; 2012), whose serial reports aim to provide a history of American paleobiology by rereading the scientists' work to highlight some important transitions, together with the interest and contributions of each scientist in the developmental science.

What the current study can take from the first type of existing scholarship is the scientific spirit of examining reported data and conclusions rather than just strictly following the re-statistics means, because the psychologists consulted in this thesis did not use that many statistics in their research. The second use of historical data is not relevant for the aims of our study as it closely focuses on the expressional issue without extension to other fields. With regards to the third type, although the current research may be similar in relation to the historical framework, it tracks the development of three methods, and its purpose is to highlight neglected information and achievements in the work of psychologists in each period, while reflections on developmental science as a whole mainly occur in the concluding chapter. A detailed description of the methods and characteristics of this dissertation are provided below.

## **3 Methodology and characteristics**

The first methodological aspect of this study to discuss is its historical method. As mentioned above, the thesis is written in a historical framework, with the achievements in expressional science being introduced in historical context by time

sequence from Darwin to Klineberg. Secondly, all the evidence used in the thesis is historical, being drawn from either scholarly publications or unpublished archives. Along with providing the history of engagements with Darwin's *Expression of Emotions* between 1870 and 1940, this thesis also carefully examines the works of Darwin, Feleky and Klineberg as the prominent users of the questionnaire, the recognition experiment, and the literary approach, respectively. Their working methods are reconstructed, from their data processing to the conclusions that they reach. In this way, some previously neglected information is presented that highlights their continuing importance in expressional science. My analysis of their work can be incorporated into a popular method in chemistry called Elemental Analysis,<sup>14</sup> which comprises both qualitative and quantitative approaches. Qualitatively, it analyses the elements that are contained in materials and subjects, whilst quantitatively it analyses the quantity of each of these elements. This method is also applicable to social sciences research, and its use was especially effective for my inquiries into some complicated problems. In each chapter, it helps to discover some unseen sources and resolve some historical problems. For example, in Chapter 1, the theoretic basis of Darwin's first principle is understood in terms of its three elements (keywords): the 'serviceable', 'association' and 'habit'. By introducing their historical origins, we are able to answer why Erasmus, whose influence on Darwin's expressional study has been credited by many historians, is not acknowledged by Darwin in the book. In Chapter 2, Darwin's Asian network is analysed in the exchange of three elements – the specimen, information and funding – to uncover the constraints in Darwin's collection of information. In Chapter 3, this method is used to reveal a hidden source of information – works of fiction – in Darwin's expressional study, and thus a link is built in Chapter 5 to connect Darwin's and Klineberg's literary studies.

Apart from the historical and quantitative methods introduced above, I also want to introduce some characteristics of this thesis, which are though scientific methods elsewhere. The first is the characteristic of contrast. In some chapters, the contrasts between the subjects that are consulted will be visible. In Chapter 1, we will see the main methods that Darwin used for his research in contrast to the less-used methods. In Chapter 2, we will see the contrast between the data on universality and the data on speciality, and also the contrast between Darwin's and Hookers' networks in China. In Chapters 4 and 5, we will see the contrasts between the scientific practices of influential psychologists and the racist claims and pseudoscience relating to research on human faces.

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<sup>14</sup> For more information on the use of this method in chemistry, see Nadkarni (1991); in social sciences, see Iyengar (1989), Creatchman (1999). For an historical introduction to this method, see Lim and Jackson (1982); Kirmse (2012).

The second is its use of science. Firstly, some scientific notions will be used to instruct the analysis and organise the chapters of this thesis, such as the hypothesis-deduction model and the phenomenon of publication bias.<sup>15</sup> Secondly, in some rare but necessary places, information will be given scientific analysis. For example, it is a norm in modern recognition experiments that participants should include members of both genders and people of diverse backgrounds. A similar claim is made by Darwin in his introduction to the method. However, this research will consider whether he did indeed follow such standards in his actual practice. Thus, Chapter 3 tabulates information on Darwin's viewers and divides them by gender and background. Further scientific analysis is used in Chapter 4 in relation to Feleky's experiments. Immediately after these experiments, Fernberger tested the suggestive effect of questions asked in the recognition of expression. As it is important for this thesis to know how suggestive Feleky's questions were, a reference group is added to show the answers provided regarding Feleky's photographs by an uninstructed viewer.

#### **4 A map of the dissertation: scholarship, questions and achievements in each chapter**

##### Chapter 1

Chapter 1 introduces the three principles and research methods presented in the *Expression of Emotions*, and concludes with a discussion of Darwin's methodology. As Darwin tells us, the *Expression of Emotions* was initially designed as one chapter of the *Descent of Man* (1871), but as a result of the extensive sources that were gathered, Darwin upgraded the volume into a separate book (Darwin 1958: 131; Prodger 2009: 6). Since the sources (data) for each principle are presented separately in the first three chapters, I then divide them into the theoretical basis and observational examples. This makes the history of each source traceable, and includes all the historical findings mentioned in Section 2 above. After this, the chapter goes on to interpret the research methods that Darwin uses in this book as the means for providing his data on expression. Using this perspective, two anonymous methods or sources are discovered. These are Method 7: Observe (healthy) adults, and Method 8: The literary approach. After a brief introduction on all the eight methods, their relationship with the three principles is explained using the hypothetico-deductive model mentioned above. Although the elemental analysis of the principles and the scientific-method discussion provided in this thesis proves to be effective in the interpretation of the *Expression of Emotions*, there is still a debate concerning the hypothesis of this book that requires introducing before the work of Chapter 1

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<sup>15</sup> This phenomenon will be introduced in Section 4.

commences. Scholars who have probed Darwin's scientific method, including Ayala (2009); Ghiselin (1969), only broadly claim that Darwin's post-1838 research tested the same hypothesis – natural selection – while allowing that Darwin's expressional study was not particularly concerned with this. On the other hand, Montgomery (1985) argues that the *Expression of Emotions* is non-Darwinian because the evolutionary mechanism in the book is not natural selection, but rather Lamarckian use-inheritance. In addition, a middle view presented by Richards (1981) and Hale (2014) contends that after 1838, Darwin continued to use natural selection and habit (Lamarckian use-inheritance) as complementary evolutionary mechanisms. Richards (1981) further advances the claim that Darwin needed the parallel mechanisms to account for the instincts of social animals. After a comparison between Darwin's several main works, it seems to me, and I will argue, that the evolutionary mechanisms proposed in the first principle are exactly the same as those proposed in the *Instinct* chapter of the *Origin of Species*. In Chapter 1, the middle viewpoint by Richards (1981) will be supported by contextualizing Darwin's expression research with his long-time studies of the instinct in Notebook M dating from 1838. Using the innovative method of elemental analysis, all the historical findings will be systematically ordered and substantiated, and quantitative results will be provided.

## Chapter 2

Desmond and Moore (2009) have discussed the impacts of Darwin's pursuit of racial uniformity in research undertaken as late as the *Descent of Man*. Chapter 2 extends this discourse to examine its influence on the *Expression of Emotions*. In addition to showing that racial unity is one of Darwin's hypotheses, another scientific notion that is brought into the discussion here is publication bias. Publication bias is a common tendency of scientists to publish positive results and to neglect negative ones.<sup>16</sup> With respect to the *Expression of Emotions*, I show that there was clear publication bias in Darwin's handling of his data (Darwin's working method), which was rooted in the process of his collection of them (Darwin's network). I then start to investigate Darwin's publication bias in dealing with Asian questionnaire answers through an examination of his network in China. Although there are scholars of the Sino-British network in the late Nineteenth Century – for example Motono (2000), Fan (2004), Hao (2014), and Abe (2015) – they rarely engage with Darwin, as the data in his famous biological writings are too extensive. In contrast, Darwin's questionnaire survey on expression avails us with an opportunity to explore his information network in a particular area of concern – China. The previous scholars acknowledge that China-based consuls and missionaries were thought to be poorly paid for their assistance to

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<sup>16</sup> The detailed explanation of this phenomenon is given in Chapter 2.

Britain-based scientists. This idea is supported by concrete facts in Chapter 2 that were learned through Darwin's contact with Robert Swinhoe, his only informant in China. Swinhoe's multiple roles as diplomat, ornithologist and botanist are discussed separately in outlining his communications with Darwin and Joseph Hooker in their respective fields of specialism. An elemental analysis of the specimen, information and money flows in their exchanges reveals that the informants were only paid for physical specimens, and not for information. This fact may have affected Darwin's questionnaire survey because many replied answers were too simple and did not conform to Darwin's requirements. By classifying and analysing the data from the Asian answers, we can figure out why question No. 16 was dropped from the original query.

### Chapter 3

Darwin may have been the first to recognize photographed expressions within a group of people and to study expressions from ancient literature. However, his use of these methods has not been well documented, leading to weak links between the *Expression of Emotions* and subsequent progressions in this field of study. In the first and only report on these methods, Snyder (2010) still provides a mistaken account of Darwin's work here, claiming that there are seven rather than ten recognition experiments presented in the book. Furthermore, Darwin's experiments are frequently misunderstood as having the aim of testing 'which of Duchenne's many photographic plates represented the best exemplars of core and readily identifiable human emotions' (p. 160). In fact, Darwin did not compare each photograph in a search for best representations, but rather each of his experiments was used for his discussion of facial muscles in expressive movements. This fact is demonstrated by reading Darwin's annotations about the 'photographic plates', his communications with Crichton-Browne and the published texts in the *Expression of Emotions* – all of which centred on muscular problems. This, in passing, explains why the copious but unrelated observations by Crichton-Browne were not quoted by Darwin. More importantly, by comparing Darwin's working manuscript with the published results, we find that Darwin had revised the data in three of the ten experiments to fit his presumptions. With the literary sources, it is found that they mark the places where Darwin lacked observational examples for the expressions concerned.

### Chapter 4

In the *Expression of Emotions*, Darwin rejects the physiognomic tradition that links physical traits with inner characters. Nonetheless, before the recognition experiment



was conducted in psychological institutions, there was still an active period of physiognomy being undertaken at the turn of the century. The work of two physiognomists is introduced as the background for Feleky's and Fernberger's scientific practices. With Feleky's research, only the photographs that she produced are referred to in later psychology, while one of her research's novel contributions to expressional study has been comparatively neglected. By analysing Feleky's procedures and results, we find that, with the help of photography, she was one of the first to capture the initial states of some emotions. Even less attention has been paid to Fernberger's research than to Feleky's tests, probably because it utilizes an abstracted facial model instead of real human faces. The facial model was composed of the drawings of Darwin's correspondent, and was referred to as Piderit faces. By reconstructing Fernberger's three experiments, the change of his purposes and the use of the facial model to test the suggestive effect of questions are shown.

## Chapter 5

As shown in Chapter 4, both empirical physiognomy and experimental recognition studied human faces with photography (or portraits), but the former inevitably led to racial discrimination. Around the 1900s, the social and intellectual background of American human sciences generated the trend of Scientific Racism – racist claims based on scientific reports. Between Darwin's and Klineberg's time, this trend evolved through three stages. The existing scholarship on this trend – e.g. Stocking (1968), Cravens (1978), Barkan (1992), and Richards (2012) – however, does not highlight the role of Klineberg and his innovative use of intelligence testing in ending the racism debate. This chapter attempts to show that, influenced by the anthropological training received at Columbia, Klineberg was the first to consider racial purity in the intelligence test, leading to the first report of equal scores between white and other races. Klineberg's correspondence with American anthropologist Franz Boas is, for the first time, consulted. In line with his cultural explanation of racial distinctions, Klineberg also studied the cultural specialty of expression through reading native literature. By summarizing the central questions asked in his short article in 1938, this chapter answers why it remains the only literary study of expression.

## Conclusion

This chapter sums up the findings in this dissertation. By historically tracking the theoretic elements of the three principles, I show that I have established the link between the *Expression of Emotions* and Darwin's earlier research, thus breaking the misconception that it is non-Darwinian. By examining Darwin's use of the three

methods, the constraints in his data collection and the publication bias in his data processing and reporting are revealed. From the steady development of the recognition experiment between Darwin's writing on the subject and the form it took in 1920s America, we can grasp the professionalization of American psychology and the shift in research ideology: from physiological doctrine to the pure psychological approach. Klineberg's study of the cultural influences on expression also epitomizes the contemporary intellectual and social reforms. Finally, the hypothetical-deductive model and our historical & quantitative analysis help to bring up some interesting contrasts between the different use of the same method consulted in this dissertation, as evidence showing the ideological influences on scientific practices.

## **Chapter 1 Darwin's *Expression of Emotions*: New Methodological Foundations for a New Evolutionary Science**

The *Expression of Emotions* (1872) opened up the scientific study of emotional expression by providing three principles and six research methods to undertake research in this area. The principles, as the main findings in the book, are highlighted and separately introduced in the first three chapters. However, from 1872 until the present day, no author has told us *how* Darwin formulated them. This chapter attempts to fill this vacuum, and starts by looking at the sources for the three principles in Part I: *The three principles alongside Darwin's studies of the instinct*. The sources for each principle, as presented by Darwin in each of the three chapters, are dissembled into theoretic bases and observational examples. There are three major findings in this part. First, it is found that the *Expression of Emotions* concludes Darwin's long-term study of the instinct that the principles explain: both the emotional expression and the instinct. Moreover, the evolutionary mechanisms expounded in Chapter I are shown to be the same with those in the *Instinct* chapter of the *Origin of Species*. Second, it is shown that although Charles Bell and Darwin's grandfather Erasmus are frequently cited by historians as making contributions to the theoretic origins of Charles Darwin's three principles, their actual contributions were overestimated. Third, we are able to find out that the principles were primarily used by Darwin to taxonomize the 'observational cases' of expressive behaviours – the typical means by which a naturalist deals with data.

Darwin's research methods on expression are introduced in Part II: *A brief introduction to Darwin's research methods*. The methods are apprehended as the sources of the data in the book. Apart from the six methods listed by Darwin, I show that there are two further methods (sources) for acquiring data used in the book: observations of adults' expressions and a literary approach. Furthermore, Charles Bell and Duchenne are found to have inspired Darwin to use two of these research methods.

After the principles and the research methods have been introduced, a curious finding emerges. This is that some of the methods contribute to none of the three principles, but do contribute to some of Darwin's other findings, such as the evolution of expression from animals to humans and the universality between human races, which are in fact, it is argued, the ultimate conclusions of the book. This leads us to ask what the relations between the principles, the research methods and the ultimate conclusions in Darwin's expressional study are. This question will be answered in the concluding section by considering Darwin's methodology. Many students of Darwin have found

his research to be characteristic of hypothesis-deduction, but confine this approach to understanding his biological works alone. This part will apply this model to analyse the *Expression of Emotions* by proposing two hypotheses and the predictions derived from them.

## **Part I: The three principles alongside Darwin's studies of instinct**

### **1 The first principle: Serviceable Associated Habits**

#### *1.1 The theoretic origin*

##### The definition in the book

‘Certain complex actions are of direct or indirect service under certain states of the mind, in order to relieve or gratify certain sensations, desires, &c.; and whenever the same state of mind is induced, however feebly, there is a tendency through the force of habit and association for the same movements to be performed’, which could be inherited by the next generation (Darwin 1872: 28).

##### A non-emotional principle?

It is conspicuous that the ‘emotion’ and ‘expression’ of the book’s title are not employed to formulate its first principle. Instead, what Darwin is concerned with here is the ‘association’ between ‘actions’ and ‘the state of mind’, when the former is under the control of the latter. During Chapter I, in relating the first principle, these words are often combined with another word – instinct – with pages 35 to 42 being devoted to relating the reflex action closely with the instinct. The author believes that ‘some reflex actions can hardly be distinguished from instincts; and, of the latter, it may be added, some cannot be distinguished from inherited habits’ (p. 35). In fact, Darwin considered the expression of emotion to be a substantially instinctive behaviour: ‘Most of our expressive actions are innate or instinctive, as is admitted by everyone’ (Darwin 1872: 358). The focuses on ‘mind’, ‘actions’ and ‘instinct’ in the above quotations are obviously consistent with those in the *Descent of Man*, for which the *Expression of Emotions* was originally designed as a chapter. Chapters II and III of the 1871 book study mental capacity and instinctive behaviours in social animals. In these chapters, Darwin faces difficulties in his attempts to show how the mental power of human beings could have originated from that capacity in lower animals. So, in the following book, he turns his focus on outer behaviour – ‘expression’ – rather than the inner capacity – ‘emotion’. Such a shift gives birth to the expressional principles that

explain the association between the emotion and the expression. However, some of the wording of the *Expression of Emotions* remains unchanged from the discussions of instinct in the *Descent of Man*. That is why numerous texts about mind-action association and instinct are referred to in Chapter I. With this insight, we can gain a deeper understanding of the first principle by interpreting the theoretical origins of its three keywords.

### Interpreting the principle through its three keywords

The composition of the first principle can be understood through its three keywords: ‘serviceable’, ‘associated’ (association) and ‘habit’. The ‘serviceable’ is generally regarded as the deformation of ‘serve’, where an expressive movement ‘act(s) in a way that gratifies or relieves – and, in this sense, “serves”– the emotion’ (Radick 2010: 182). In short, ‘serviceable’ means that expression serves emotion. Despite this literal understanding, the origin of ‘serviceable’ has rarely been mentioned by previous scholars. It should be noted that it was derived from Herbert Spencer’s *Physiology of Laughter* (1863), as Darwin states below:

‘Mr. Spencer has also published a valuable essay on the Physiology of Laughter, in which he insists on "the general law that feeling passing a certain pitch, habitually vents itself in bodily action;" and that "an overflow of nerve-force undirected by any motive, will manifestly take first the most habitual routes; and if these do not suffice, will next overflow into the less habitual ones." This law I believe to be of the highest importance in throwing light on our subject’ (Darwin 1872: 9–10).

Spencer’s claim that ‘feeling ... habitually vents itself in bodily action’ inspired Darwin’s idea that expression is ‘serviceable’ to ‘relieve or gratify certain sensations’ (p. 28). Although Darwin had been studying mind-action associations and expressive behaviours alongside his long-term thinking on the instinct since 1838<sup>17</sup>, the first principle, and especially the notion of the ‘serviceable’, could not have been composed before he came across Spencer’s essay in 1863. Spencer’s proposition that expression relieves emotion produced a similar effect on Darwin as Wallace’s announcement of natural selection, because it also forced Darwin to expend some effort in justifying his originality: ‘I may state, in order that I may not be accused of trespassing on Mr. Spencer’s domain, that I announced in my *Descent of Man*, that I had then written a part of the present volume: my first MS. notes on the subject of expression bear the date of the year 1838’ (p. 10). Section 3 below will show that Spencer also contributed

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<sup>17</sup> Darwin’s Notebook M *Metaphysics on Morals and Speculations on Expression* was written in 1838, recording many thoughts on the instinct – the details of which are provided below.

to the theoretic basis of the third principle.

With respect to ‘habit’, Darwin undoubtedly learned that long repeated habits can be inherited from Lamarck – i.e. Lamarckian use-inheritance. In relation to Darwin’s conception of ‘association’, Montgomery (1985) suggests that Darwin learned this from the *Zoonomia* – the principal writing of his grandfather, Erasmus Darwin (1731–1802). I would like to add that, in both the *Zoonomia* and Charles Darwin’s Notebook M, ‘association’ is bound with ‘habit’ in the authors’ discussions of the instinct. For example, they emerge in the *Instinct* chapter of the *Zoonomia*, with Erasmus writing, ‘All the fibrous motions, whether muscular or sensual, which are frequently brought into action together ... become so connected by habit, that when one of them is reproduced the others have a tendency to succeed or accompany it’ (Erasmus Darwin 1794: 49; Montgomery 1985: 39). Similarly, the parallel text is noted on page 46 of Charles’s Notebook M, in which the word ‘association’ first appears:

‘When a muscle is moved very often, the motion becomes habitual and involuntary. ... An intentional recollection of anything is solely by association, and association is probably a physical effect of brain the similar remark thoughts, being functions of same part of brain, or the tendency to habit of producing a train of thought’ (Darwin 1838: 46).

Despite the similarity between the above texts, Montgomery’s suggestion that Erasmus’s work had a ‘huge’ influence on the *Expression of Emotions* conflicts with the fact that Erasmus is not acknowledged here by Charles Darwin along with the authors he does cite – Charles Bell, Duchenne and many other physiologists – in the *Introduction* to the book. I would like to untangle this contradiction as follows. First, we need to note that the idea of association has a long history before Erasmus Darwin, and can be traced back in the philosophical writings of Locke (1632–1704), David Hartley (1705–1757) and Darwin’s contemporary James Mill in his *Analysis of the Phenomena of the Human Mind* (1829) (see Smith 1997: 250–259). Thus, neither ‘association’ nor ‘habit’ were invented by Erasmus Darwin. Second, since the first principle is about evolutionary mechanisms, ‘habit’ (Lamarckian use-inheritance) is certainly of more importance than the basic notion of association. The use of ‘habit’ has been recorded not only in Notebook M, but also in the *Origin of Species* (as shown in Table 1.1 below). Readers who question Erasmus’s absence in the acknowledgements of the *Expression of Emotions* should first wonder why he is not acknowledged in the *Instinct* chapter of the *Origin of Species* either, in which habitual association is for the first time articulated in Darwin’s books.

The above discussions of ‘habit’ and instinct can also cast light on Darwin’s evolutionary standpoint in the book. There have been some disagreements over this matter in previous scholarship. Montgomery (1985) believes that Darwin adopts Lamarckian use-inheritance rather than natural selection as the evolutionary mechanism in the *Expression of Emotions*, for he cannot find natural selection being invoked anywhere in the first three chapters. Conversely, Richards (1981) suggests that after 1838, when Darwin became a selectionist, he continued to employ natural selection and use-inheritance side-by-side to explain organisms’ evolutions. Below we attempt to figure out the problem by summarizing the evolutionary mechanisms in both the 1859 and 1872 books of Darwin.

### Two evolutionary mechanisms

As mentioned previously, the large number of texts about instinct in the *Expression of Emotions* coincides with the fact that it was originally designed as one chapter of the *Descent of Man*. Another clue about the theoretical consistency seen throughout Darwin’s works is given by the evolutionary theories. The *Expression of Emotions* not only extends Darwin’s earlier studies of the instinct by focusing on outer manifestations of emotion, but also inherits the evolutionary model. The evolutionary mechanisms of expression are written in Chapter I: ‘although some instincts have been developed simply through long-continued and inherited habit, other highly complex ones have been developed through the preservation of variations of pre-existing instincts – that is, through natural selection’ (p. 41). Here, Darwin actually proposes two evolutionary mechanisms: the first is that long-continued habits can be inherited; the second is natural selection. Interestingly, this presentation is exactly the same as in the *Instinct* chapter of the *Origin of Species*. In Chapter VII: *Instinct* of the 1859 book, one section in the latter half of this chapter admits the *Difficulties on the theory of the Natural Selection of instincts*<sup>18</sup>. But, in the *Summary*<sup>19</sup> of the chapter, Darwin still insists on his belief in the role that natural selection plays in the evolution of instinct, expounding the unchanged theme in the studies of the instinct in the three books:

‘I have endeavoured briefly in this chapter to show that the mental qualities of our domestic animals vary, and that the variations are inherited. Still more briefly I have attempted to show that instincts vary slightly in a state of nature. No one will dispute that instincts are of the highest importance to each animal. Therefore I can

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<sup>18</sup> Swisher (1967), Burkhardt (1985) and Gordillo-García (2016) have all mentioned Darwin’s discussion of instinct, but only in relation to what he discusses about it in the *Origin of Species*, and merely associated with natural selection.

<sup>19</sup> The *Difficulties on the theory of the Natural Selection of instincts* and *Summary* are the section titles in the *Instinct* chapter of the *Origin of Species*.

see no difficulty, under changing conditions of life, in natural selection accumulating slight modifications of instinct to any extent, in any useful direction. In some cases habit or use and disuse have probably come into play' (p. 242–243).

To make it clear, the evolutionary mechanisms in both the *Instinct* chapter of the *Origin of Species* and the first chapter of the *Expression of Emotions* are summarized in Table 1.1 below. The first column presents the two kinds of evolutionary mechanisms, whilst the second presents what is said on the matter in the *Origin of Species*, and the last presents the same for the *Expression of Emotions*.

Table 1.1 The evolutionary mechanisms in the *Origin of Species* and the *Expression of Emotions*

Evolutionary mechanisms	Text in the <i>Instinct</i> chapter of the <i>Origin of Species</i>	Text in the <i>Expression of Emotions</i>
Natural selection	'instincts are of the highest importance to each animal', therefore, natural selection modifies instinct 'in any useful direction' (Darwin 1859: 243).	'other highly complex ones have been developed through the preservation of variations of pre-existing instincts – that is, through natural selection' (Darwin 1872: 41).
Habit (use-inheritance)	'In some cases habit or use and disuse have probably come into play' (Darwin 1859: 243).	'some instincts have been developed simply through long-continued and inherited habit' (Darwin 1872: 41).

As Table 1.1 shows, Darwin's attitudes to natural selection and habit are consistent in the two books. Hence, Richards' (1981) argument that Darwin continued to understand natural selection and habit (Lamarckian use-inheritance) to work side-by-side as evolutionary mechanisms is proved to be well grounded. In contrast, Montgomery's one-sided emphasis on 'habit' (Lamarckian use-inheritance) is misleading. On the grounds of the above analysis, the first principle can be paraphrased as asserting: *some expressions of emotions, as instinctive behaviours, are formed by habits (Lamarckian use-inheritance) and developed by natural selection*. The 'some' here corresponds to the 'certain' in the original definition. It implies that other expressions of emotions are explained by the additional two principles, as will be shown in Section 2-4 below. I now would like to examine the domain of the first principle using the observational cases provided by Darwin in Chapter I.



### 1.2 *The observational cases*

After Darwin proposes the first principle and explains it, he then provides a group of observational facts to uphold and illustrate it. There are forty-eight<sup>20</sup> examples of human and animal expressions offered in Chapter I, with thirty-one being animal examples and seventeen human ones. In the animal cases, the most common animal used is the dog, which is used in eight cases; second is the horse, with four examples; followed by the cat and the jackal, which are both used three times, then the cow, the wolf, the fennec, the pig and six kinds of bird, each of them appearing once. The lowest animals (the amphibians and the insects) are the frog, a kind of moth<sup>21</sup> and the caterpillar, which all have one example. In the human cases, three cases involve infants, while the other fourteen involve adults. A noteworthy fact is that the infant cases and the three lowest animal cases all refer to instincts rather than emotional expressions: the amphibian and insects certainly have no observable expression of emotion to Darwin, and the infant cases are all about reflex actions, e.g. sneezing and coughing (see Darwin 1872: 36).

### 1.3 *Conclusion*

The testimonies above are sufficient to show that the Principle of Serviceable Associated Habits is used by Darwin to explain the formation and inheritance of both the instinct and the expression of emotion. In Chapter I, Darwin mixes up or, perhaps better, ‘treats equally’ the three items of reflex action, instinct and the expression of emotion and, through the entirety of the book, there is no discussion of the differences between them. Instead, Darwin endeavours to convince the readers that the expression of emotion and instinct are the same, both through logical reasoning (see Section 1.1) and promiscuous exemplification (see Section 1.2). In this way, Darwin attempts to link the higher animals (the mammals, including human beings) with the lower animals. Only by making the expression of emotion an instinctive behaviour can he validate the inner unity of all species through the same evolutionary law – natural selection and habit (use-inheritance) – which functions to confer instinct in lower animals and the expression of emotion in higher animals (see the emotional and non-emotional cases given in Section 1.2).

We can now see why it is reasonable for this principle to come first – it expresses the

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<sup>20</sup> The number of cases has been interpreted in this way as follows: when several animals are exemplified for one expression of emotion, this is counted as one case, and the animal attached to this case is one of the least mentioned animals. For example, when Darwin says that dog, horse and pig express startlement, it is counted as ‘pig once’ as the other two animals have already appeared many times in cases for other emotions.

<sup>21</sup> The Humming-bird Sphinx-moth (*Macroglossa*) (p. 30).

central proposition provided in Darwin's earlier books: the *Origin of Species* (1859) and the *Descent of Man* (1871). As illustrated above, the *Expression of Emotions* provides the conclusion to Darwin's previous studies of the instinct by outlining the mechanisms of the mind-action association: the three principles. The merits of the three books are coherent in that, in the *Origin of Species*, Darwin verifies that the evolution of the external characteristics of humans and animals follows the same law: the combination of natural selection and use-inheritance; before attempting in the *Descent of Man* and succeeding in the *Expression of Emotions* to show how the same law can also govern the field of the mind-action association. In the *Descent of Man*, Darwin tries to verify that both human and animal emotions derive from social instincts, but this goal is not fully achieved due to the lack of evidence. Consequently, in the *Expression of Emotions*, he turns to focus on the expression of emotion – the outer manifestations of mental states. Therefore, the conception of evolution and the theme of instinctive studies are consistent, and remain intact throughout the three books.

## **2 The second principle: Antithesis**

### *2.1 The theoretic basis*

#### The definition in the book

‘When a directly opposite state of mind is induced, there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these are of no use; and such movements are in some cases highly expressive’ (Darwin 1872: 50).

The logical relationship in the above definition is that ‘the movements of a directly opposite nature’ are wider than the expressive movements since they are only ‘in some cases highly expressive’. In other words, the Principle of Antithesis explains broader movements, including the expression of emotions. It is, indeed, another finding that comes out of Darwin's thinking about instinct. Moreover, the second principle is the most original one of the three, because the theory it is based on and the examples that are used are provided by Darwin himself, rather than being citations of the work of others.<sup>22</sup> On the other hand, however, it has aroused much criticism<sup>23</sup>, mostly due to the overemphasis that many readers have placed on one claim within the definition: that the antithetical movements ‘are of no use’. In fact, in Chapter II – relating to the

<sup>22</sup> Except for several drawings of animals for illustration.

<sup>23</sup> See Sully (1874: 29); Mantegazza (1885: 76); and Dumont (1877: 236).

second principle – Darwin frequently mentions the possible usefulness of these movements to organisms:

‘On this principle alone can I understand how the gestures and expressions which come under the present head of antithesis have originated. If indeed they are serviceable to man or to any other animal, in aid of inarticulate cries or language, they will likewise be voluntarily employed, and the habit will thus be strengthened (p. 65).

In Darwin’s statement here it is clear that he is not denying the usefulness of the antithesis expression, but suggesting it has a role in communication, given that, ‘with social animals, the power of intercommunication between the members of the same community – and with other species ... is of the highest importance to them’ (p. 60). He further claims that the Principle of Antithesis is essential for the invention of languages, including conventional signs (sign language) (pp. 61–62). The ‘sign language’ is discussed in Chapters II and III of the *Descent of Man: the Comparison of the mental capacity of man and the lower animals* and – continued. Thus, we can see that the discussion of this principle should stay in the domain of social animals (or animals with social instincts<sup>24</sup>), which can be seen from the observational examples summarized below.

## 2.2 *The observational cases*

Unlike the first principle, the second one does not appear either in Darwin’s notebooks<sup>25</sup> or in the *Descent of Man*. It is summarized from Darwin’s personal observations without the use of quotation from other scholars. There are three pieces of observation offered in Chapter II of the book. Two of them use dogs as examples, and the other one cats. In terms of the expressions of dogs and cats, Darwin observes that it is generally remarked that, when they are happy or showing kindness to their hosts, their behaviours are exactly opposite to those seen when they are angry or offended (p. 64). Apart from these sentence-length notes, Darwin offers an observation on his own dog. Its pleasure in going out walking and disappointment when it stops walking are described in detail to illustrate the ‘instantaneous and complete change of expression’ of the animal.

<sup>24</sup> The way in which ‘social animal’ is used in Chapters II and III of the 1871 book is somewhat vague, as Darwin tends to view all animals as bearing social instincts. A clear classification is never made, either in the *Descent of Man* or in the *Expression of Emotions*.

<sup>25</sup> As Montgomery points out, on pages 146–147 of Notebook M, Darwin provides an example of antithesis expression for a dog (Montgomery 1985: 41). But, at that time, antithesis expression was conceived of as being an observational phenomenon rather than a general principle. The Principle of Antithesis only arose after Darwin had compiled his files.

### 3 The third principle: Direct action of the nervous system

#### The definition in the book

‘Certain actions, which we recognize as expressive of certain states of the mind, are the direct result of the constitution of the nervous system, and have been from the first independent of the will, and, to a large extent, of habit’ (p. 66).

This principle was derived from both the observational cases Darwin collected and through a theoretical summary of the work of the contemporary philosophers and physiologists of Darwin’s time. These sources are introduced below.

#### *3.1 The theoretical citations*

The principle has two parts, which are that certain expressive actions are: (1) the direct result of the constitution of the nervous system; and (2) independent of the first two principles. Darwin’s insights into the first part about the nervous system are all cited, without paraphrasing, from physiologists such as Johannes Müller (1801–1858) and Herbert Spencer (1820-1903). For example, to interpret the trembling of muscles, Darwin cites Müller’s argument in the *Elements of Physiology* (1842) that ‘any strong excitement of the nervous system interrupts the steady flow of nerve-force to the muscles’ (Müller 1842: 934; Darwin 1872: 68). The second part of the principle, concerning the independence of actions from the states of mind described in the first two principles, is actually the core part that reveals how the third principle was formulated. It suggests a classification – something that Darwin was always good at as a naturalist – of the expressive actions. Though not clearly stated by the author, the procedures in Darwin’s expressional study can be inferred as follows: first, to collect expressive behaviours of both humans and animals; second, to categorize them into three types; third, to devise principles to explain each type. We would now like to see what kinds of expression Darwin wants to attribute to the constitution of the nervous system.

#### *3.2 The observational facts*

Using both his own observations and those of others, Darwin provides seven groups of expression that are subject to the third principle. They are: the trembling of the muscles, the beating of the heart, perspiration, respiration, modified secretions,

unintentional sounds<sup>26</sup> and changes of hair colour. These expressions are sequenced here by the number of examples provided in the book. The first six are explained using cases from both humans and animals, while the last one uses a human example only, which is cited from other scholars. The lowest animals used in the examples are two kinds of bird, which are cited with respect to the trembling of muscles and the loss of skin colour. None of the seven groups of expression, such as the loss of hair colour<sup>27</sup>, can be explained by either the first or the second principle, and Darwin attributed these to the direct effect of the nervous system.

#### 4 Concluding discussion of the three principles

##### 4.1 *Their formations and meanings in Darwin's framework*

As the above sections show, Darwin's expressional research was conducted alongside his long-time interest in the instinct, but was focused more tightly on the mind-action association. The idea of habitual association had already been noted in Notebook M in 1938. This idea was later bound with natural selection to account for evolutionary mechanisms in the *Instinct* chapter of the *Origin and Species*. Since the *Origin of Species* mainly deals with physical evolution, two chapters (Chapters II and III) of the *Descent of Man* were designed to extend this discussion to mental issues. Given the difficulties that Darwin faced in giving an evolutionary explanation of mental capacity, and enlightened by Charles Bell's specialized treatise on expression, Darwin decided to focus on the outer manifestation of mental states – the expression. However, the expressive samples Darwin collected had largely exceeded the arranged volume, which led to the publication of a separate essay, the *Expression of Emotions*. Utilizing a naturalist approach, as he did in his earlier work, Darwin applied a taxonomy to the expressive phenomenon as well, which were divided in three types. With most of the expressions, the naturalist had no difficulty using Spencer's 'serviceable' explanation. The first principle was then invented by assembling Darwin's earlier thoughts on 'habit' and 'association' using the newly imported 'serviceable' construct. Furthermore, in Chapter I – relating to the first principle – natural selection also emerges to account for the inheritance of complexed instincts (expression). Thus, the evolutionary mechanism appealed to in 1872 is the same as that argued for in the *Origin of Species* – that is, habit (use-inheritance) and natural selection are used side-by-side.

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<sup>26</sup> 'Unintentional sounds' are not associated with the respiratory movements discussed in the same chapter. The respiratory movements in emotion were later studied by an American psychologist, and will be discussed in Chapter 4 of this thesis.

<sup>27</sup> This case was initially introduced because, in Darwin's mind, it best demonstrated the effect of the nervous system, which is 'independent of the will, and, ... of habit', or, in other word, independent of the effects of the first principle.

When constructing the taxonomy, Darwin also found two special types of expression: the antithetical expression pairs and the seven groups of expression. In order to include them into the scope of evolutionary theory, Darwin had to verify that they were useful/serviceable to animals (including humans). His trial with the second type was successful, and the antithetical expression was claimed as necessary for the emergence of human and animal languages (conventional and gestural signs), which are useful for communication. However, with the third type, Darwin failed to see any usefulness in any of the expressions, like the erection of the hair, which were then submitted to the constitution of the nervous system – an idea copied wholesale from physiologists.

By now, we can see that part of the theoretical grounding of the first principle ('habit' and 'association') came to Darwin prior to his gathering of the observational facts, while the other two principles were obtained after classifying those facts. In Darwin's mind, the first principle played a fundamental role in explaining most of the expressive actions, whereas the other principles were at first used to categorize and label the two special types of expression. Thus, the second and third principles are subordinate to the first one. There is no conflict between 1 and the combination of 2 and 3 because Darwin never stated that the expressions in Chapters II and III were not relieving (or say, serviceable to) the emotions. In fact, Darwin had no means in his time to test whether any expression relieved the emotion or not. One of the differences between the three types is that Darwin can see no survival usefulness in the third type of expression (such as the perspiration and loss of hair colour) as he could in the first two types.

#### *4.2 The application scopes of the three principles*

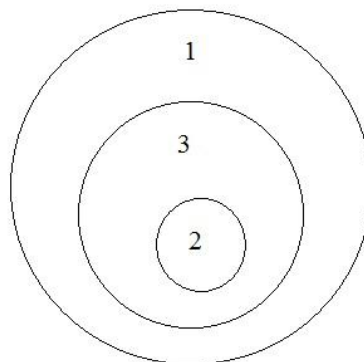


Fig. 1.1 The domains of the three principles

Another difference between the three principles is their scope of application. By quantifying the examples noted in Sections 1.2, 2.2 and 3.2, the scopes of the principles provided for the animals (including humans) in the first three chapters are depicted in Fig. 1.1 above. The numbers – 1, 2 and 3 – represent each of the principles, with the space of each circle representing the number and range of animals applicable to each principle. As these areas suggest, the most animal examples (48) are provided for the first principle, and these also include the broadest range, from the ‘highest’ mammal (humans) to the ‘lowest’ animals, including six kinds of bird, frogs, moths and caterpillars. The third principle, with around 13 cases (in seven groups), is the middle one, only applicable to those with a nervous system. Though Darwin does not clearly indicate what kinds of animal have a nervous system, the lowest animals that figure in Chapter III are two kinds of bird. With the fewest numbers (3 examples) and the smallest range, the second principle is observed merely in higher mammals: dogs and cats. It may be noteworthy that only the second principle has no human example provided for it.<sup>28</sup>

#### 4.3 *The degree of originality*

As discussed in Section 1, Darwin incorporated the theories of Spencer and Lamarck into his evolutionary theory to formulate the first principle. This calls for us to consider the degree of originality (DO) in Darwin’s composition of each of the principles, which can be seen by considering the percentage of the theoretical bases and observational cases that were provided by Darwin himself<sup>29</sup> rather than being quoted from other scholars. From the theoretical bases noted in Sections 1.1, 2.1 and 3.1 and the observational cases counted in Sections 1.2, 2.2 and 3.2, we can separately work out the DO of the two parts of each principle, and these are summarized in Table 1.2 below. The first column represents the three chapters containing the sources for each of the principles. The second column is the DO of the theories, and the third column is the DO of the examples.

Table 1.2 The degree of originality of the sources for the three principles

Chapters on the principles	DO of the theoretical basis	DO of the examples
Chapter I on Principle 1	50%	50%
Chapter II on Principle 2	100%	100%

<sup>28</sup> In the following chapters discussing Darwin’s use of three research methods, we can possibly view his unfulfilled attempts to extend the second principle to the human domain.

<sup>29</sup> I.e., either invented in his expressional research or inherited from his earlier findings.

Chapter III on Principle 3	0%	20%
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In the definition of the first principle, ‘habit’ and ‘association’ are articulated by Darwin in the *Origin and Species*, and in the much earlier records of the 1838 Notebook M. Darwin’s original contribution here was to combine habitual association (i.e. Lamarckian use-inheritance) with natural selection to account for the evolutionary mechanisms of expressive behaviours. This was something that antecedent scholarship had failed to see. By contrast, the ‘serviceable’ idea that expression serves/relieves emotion is not taken from Spencer (1860), as Darwin himself confesses in the book. So, the DO of the whole theory is 50% innovative. Following the definition in Chapter I illustrating the first principle, almost half of the examples that Darwin provides come from his own observation or experiences, while the other half are cited from the work of others. Hence, the DO of the examples is also 50%. In relation to the second principle, Montgomery suggests that ‘it seems to have been his [Darwin’s] own invention’ (1985: 41). I would like to add that, after compiling the collected expressive behaviours, the second two principles were initially used to label the two types of expression. The difference between them is that Darwin created the theoretic basis of the second principle himself, while the information on the physiological constitution of the nervous system is all cited to physiologists.<sup>30</sup> Thus, the DO of these theories are 100% and 0% respectively. With the observational examples, the three cases in Chapter II were all observed by Darwin himself, while most of the facts in Chapter III were cited from sources, revealing Darwin’s relative lack of knowledge about anatomy and physiology.

Based on the results in Table 1.2, we get the Degree of Originality of the three principles in general, as shown in Fig. 1.2 below, where the numbers 1, 2 and 3 correspond to each principle. The higher it is in the pyramid, the higher its overall DO. This shows that the second principle has the highest DO, while the third principle bears the lowest, with the first one in the middle. The second principle was obtained entirely through Darwin’s own efforts, without citing others’ theories or observations, whilst Darwin contributed none of the neurological theories for the third principle, and much fewer anatomical and observational examples than the references suggest.

<sup>30</sup> Three main contributors acknowledged in Chapter III with reference to information on the nervous system are Müller, Spencer and Claude Bernard (1813–1878). Besides these, the works of Duchenne and Jakob Henle (1809–1885) and other physiologists also enlightened Darwin’s thoughts on expression.



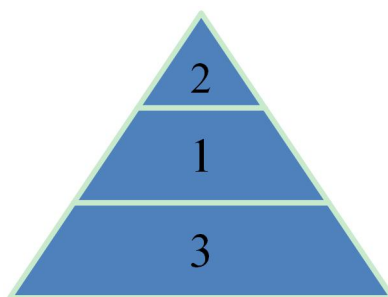


Fig. 1.2 The degree of originality of the three principles

In conclusion, by separately recording the theories and examples of the three principles, we have now identified both their theoretic origins (e.g. the historical interpretation of the keywords in the first principle) and the procedures in Darwin's expressional study that the taxonomy was required to produce. The *Expression of Emotions* appears to have followed the same naturalist approach that was applied to the larger number of samples collected in the *Beagle* voyage to create the most famous and influential of Darwin's books – the *Origin of Species*. Like those larger volumes from 1859 and 1871, the naturalist's specialized treatise on expression is also unique and worthy of study, for there are six research methods highlighted in the beginning that offer us the chance to examine Darwin's data collection process through these methods. I would now like to briefly introduce them and discuss which ones we should concentrate on.

## **Part II A brief introduction to Darwin's research methods**

### **5 Darwin's eight research methods on expression**

At the beginning of the *Expression of Emotions*, Darwin points to two difficulties concerning the study of expression. The first is that 'the movements [are] often extremely slight, and of a fleeting nature' (Darwin 1872: 13). The second is the limitations of observers in terms of their sympathy and imagination in response to others' emotions, which can affect the observation process and the observer's judgement. In order to overcome these problems, Darwin outlines six research methods with a scientific outlook that rejects the old tradition of physiognomy.<sup>31</sup> The first useful method listed by Darwin is that of observing infants.

#### **Method 1: Observe infants**

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<sup>31</sup> Physiognomy is 'the recognition of character through the study of the permanent form of the features' (Darwin 1872: 1). Parsons (1746) gives a list of 41 treatises on physiognomy, but all are found by Darwin to be of little or no service.

Darwin's use of this method was inspired by Charles Bell's *The Anatomy and Philosophy of Expression, as Connected with the Fine Arts* (referred to hereafter as the *Anatomy of Expression*, as Darwin calls it in the *Expression of Emotions*). It was first published in 1806, but Darwin used the third version from 1844. As Bell remarks, infants exhibit many emotions 'with extraordinary force', which will cease to manifest in later life (Bell 1844: 198; Darwin 1872: 13). Darwin adopted this idea and started to observe his first son, William, from his birth on 27 December 1839 (Darwin 1958: 131). His notes on these observations were published as a separate essay in 1877 in the journal *Mind*. This piece of work should now be incorporated into the field of Developmental Psychology. Nonetheless, in the *Expression of Emotions*, Darwin does not follow his diary in narrating the developmental expression of his infant, but rather provides discrete descriptions of certain movements. Moreover, most of the infant cases in the book are not from Darwin's own observation, but are cited from the works of other researchers. All the cases of infants and young children in the book are used to affirm that the expressions regarded are the same in adults (for one such comparison, see Fig. 1.3 below, regarding the depression of mouth corners).



Fig. 1.3 Plate II in the *Expression of Emotions* (Darwin 1872: 180)

Method 2: Observe psychopaths

Darwin's second method for studying expression is to observe psychopaths, because they 'are liable to the strongest passions, and give uncontrolled vent to them' (p. 13). In contrast to healthy adults, the clinically insane people usually do not suppress their emotions as a result of their mental health conditions. Darwin himself had no opportunity to access psychopaths, so the observation was all undertaken by two of his correspondents who were psychiatrists: Patrick Nicol, who worked at the Sussex Lunatic Asylum, and James Crichton-Browne, who administered the West Riding Lunatic Asylum in Wakefield from 1866 to 1875. Crichton-Browne's father, asylum reformer William A. F. Browne (1805–1885), who was mentioned in the introductory chapter of this thesis, had refuted Bell's creationist view on expression in front of Darwin at the Plinian society meeting whilst Darwin was studying at Edinburgh University. Crichton-Browne sent Darwin forty-four photographs of expressions of clinically insane individuals, although only one of these was presented in the *Expression of Emotions* (see Fig. 1.4 below).



Fig. 1.4 'Photograph of an insane woman, to show the condition of her hair' (p. 296)

On this expression, Darwin concludes that, 'the fact of the hair becoming erect under the influence both of rage and fear agrees perfectly with what we have seen in the lower animals' (p. 296). The photographs provided by Crichton-Browne were the only

human cases available to Darwin. Darwin notes that his other informant, ‘Mr. Patrick Nicol has also kindly observed for me several cases in the Sussex Lunatic Asylum... but they need not here be given’ (pp. 185–186). Nicol’s reports are, however, occasionally mentioned in brief to corroborate Crichton-Browne’s observations. It thus seems that Darwin bore certain criterion in screening the collected information, and at the end of this section, we will try to figure out his criteria for managing these methods.

### Method 3: Recognition experiments



Fig. 1.5 One sheet in Darwin’s copy of Duchenne’s Album (Snyder et al. 2010:161; CUL)

The third method uses photographs provided by G. B. Duchenne (1806–1875), a French physician and neurologist.<sup>32</sup> As Fig. 1.5 above shows, Duchenne ran electric currents through the facial muscles of one of his patients to produce various expressions and then photographed them (Darwin 1872: 14). Duchenne compiled these photographs into an album,<sup>33</sup> which he published in a book called *The Mechanism of Human Physiognomy* (1862). Darwin held a copy of the book together with the album. The third method made use of the album, of which Darwin says: ‘It fortunately occurred to me to show several of the best plates, without a word of explanation, to above twenty educated persons of various ages and both sexes, asking them, in each case, by what emotion or feeling the old man was supposed to be agitated; and I recorded their answers in the words which they used’ (p. 15). This method for recognizing expressions from photographs is now referred to as the recognition experiment, and Darwin should be credited as the first to use it.<sup>34</sup> However, there are some problems about Darwin’s statement here, as well as his use of this method. First, the aim of the recognition experiment is not clearly indicated. Modern users of the technique usually either test the ability of viewers to interpret the expression of emotion or determine which emotions can be recognized by cross-racial viewers. But neither of these intentions fits Darwin’s use of the experiment. Darwin’s statement in the *Introduction* is very ambiguous:

‘Several of the expressions were instantly recognised by almost everyone, though described in not exactly the same terms; and these may, I think, be relied on as truthful, and will hereafter be specified. On the other hand, the most widely different judgments were pronounced in regard to some of them. This exhibition was of use in another way, by convincing me how easily we may be misguided by our imagination’ (Darwin 1872: 14).

Darwin seems to indicate here that, first, he will distinguish the easily recognizable expressions from the others, and second that the other difficult expressions can show us how easily we can be misguided by imagination. However, throughout the course of the book, Darwin never attempts to achieve these tasks, with the experimental results

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<sup>32</sup> Duchenne was the father of French neurology, and is especially known for his research on electrophysiology. For more information on Duchenne and his achievements, see Garrison (1913); McHenry (1969); Delaporte (2008). His major work, which provided the tools for Darwin’s recognition experiment, will be discussed further in Chapter 3.

<sup>33</sup> Duchenne produced the Album with five patients. Darwin used the photographs of two of them: the old man in Fig. 1.5 and the young man in Fig. 1.3 (Images 1 and 2). In the *Expression of Emotions*, the electronic probes only appear in the two photographs of the old man. Darwin’s pencil marks on the sheet of Fig. 1.5 were to instruct his publisher to remove the electrodes in the image, which may be the earliest example of photo-shopping in a scientific publication.

<sup>34</sup> See Ekman (1972); Plamper (2015).

being neither summarized together nor compared with each other. What, then, is the aim of Darwin's recognition experiment? The question will be answered in Chapter 3 through looking at the original data from Darwin's manuscript. We will also find that the plates were not always presented, as Darwin says, 'without a word of explanation', and furthermore that Darwin altered some of the results to fit his arguments.

#### Method 4: Observe artworks

The idea for this method of observing sculptures and paintings can probably be attributed to Duchenne and Charles Bell, as can be inferred from the latter half of Bell's book title: *as Connected with the Fine Arts*. However, this method seldom contributes to Darwin's expressional study for two reasons. In Chapter VII, which discusses the 'grief muscles', Darwin writes that:

'The ancient Greek sculptors were familiar with the expression, as shown in the statues of the Laocoon and Arrotino; but, as Duchenne remarks, they carried the transverse furrows across the whole breadth of the forehead, and thus committed a great anatomical mistake: this is likewise the case in some modern statues' (p. 184).

This leads to the first reason that this method is seldom used, which is that mistakes can be made in using artworks as artists have sometimes 'intentionally sacrificed truth for the sake of beauty' (pp. 184–185). The second reason is even more fundamental: that photography surpasses painting brushes and gravers in demonstrating subtle features. The photographic technique was invented during the early decades of the Nineteenth Century, and was mostly used for commerce by the end of the 1850s, with Duchenne becoming one of the pioneers that employed the new technique in scientific research.<sup>35</sup> Until the *Descent of Man*, Darwin's books only used wood engravings as illustrations but, given the popularity of photography in England and the necessity to use it for the study of expression, Darwin made several trips to London photo studios to search for suitable photographs.<sup>36</sup> The *Expression of Emotions* thus became the first book that Darwin partially illustrated with photographs,<sup>37</sup> as shown in Fig. 1.3–1.5 above. Supplanted by the new technique, the scarcely-mentioned artworks therefore contributed almost nothing to the book.

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<sup>35</sup> For the history of photography and its use in science, see Benjamin (1972); Hirsch (2008). For more information on Darwin's use of photographs, see Prodger (2009).

<sup>36</sup> Prodger (2009) mentions that Darwin had earlier consulted some famous paintings on expression, but found them valueless in terms of their illustrations.

<sup>37</sup> There are still some wood engravings in the book, such as the plates of animal expressions in Chapters II and IV.



## Method 5: The questionnaire

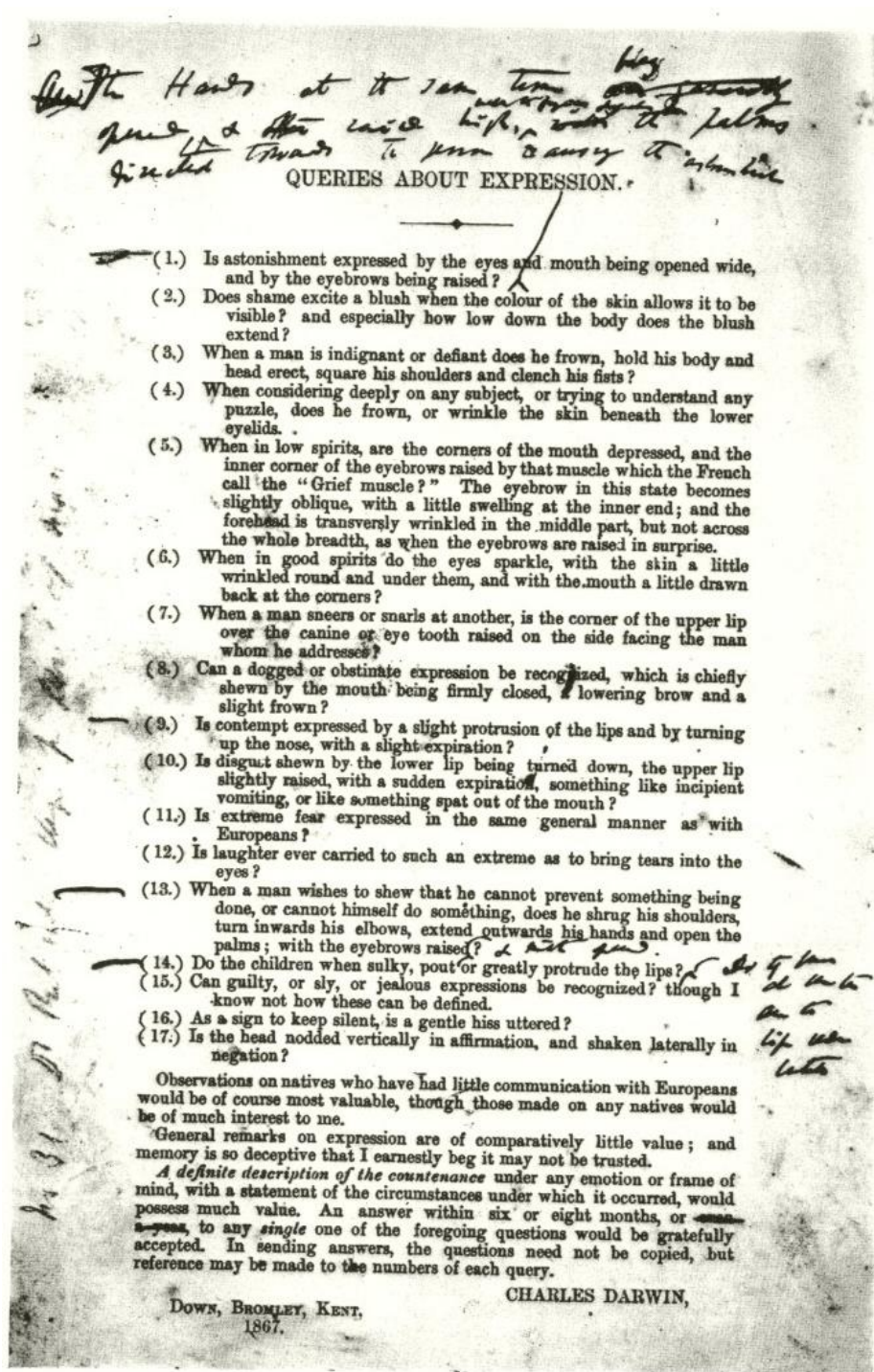


Fig. 1.6 Darwin's query on expression (Freeman and Gautrey 1972: 205)

This is the only method used that draws comparisons between human races, and Darwin says that: 'Fifthly, it seemed to me highly important to ascertain whether the same expressions and gestures prevail, as has often been asserted without much

evidence, with all the races of mankind, especially with those who have associated but little with Europeans' (Darwin 1872: 15). Darwin wrote a group of questions followed by an instruction for his informants throughout the world. The printed copies (see Fig. 1.6 above) were sent out during 1867 (p. 15). Finally, thirty-six letters were received in response to Darwin's query, coming from Asia, Africa, North and South America and Oceania, as mapped in Fig. 1.7 below. All the correspondents are acknowledged in the book. The names and locations of the thirty-one informants (some replied with two or more letters) are ordered in Table 1.3 below. The first column details the regions where the respondents resided, and the second column notes their family names.



Fig. 1.7 Darwin's information map on the questionnaire survey (DCP<sup>38</sup> 2013)

Table 1.3 The names and regions of the informants for Darwin's questionnaire survey

Regions	Darwin's correspondents
China, Malay and Philippines	Swinhoe, Brooke, Geach, Meyer
India and Sri Lanka	Erskine, West, Scott, Glenie
Australia and New Zealand	Wilson, Dyson Lacy, Smyth, Hagenauer, Samuel Wilson, Taplin, G. Lang, Lane, Bunnett, Bulmer, Ferdinand Müller, Green, Stack, Brooke
Africa	Reade, Barber, Weale, Gaika, Speedy, Gray
America	Bridges, Rothrock, Matthews

The query is also provided in the *Introduction* of the book. However, Darwin made some revisions to the version that was published from the version that was sent out in

<sup>38</sup> Darwin's correspondence project.



1867 (see Fig. 1.6).<sup>39</sup> The most significant change was that Question 16 on the 1867 query – ‘As a sign to keep silent, is a gentle hiss uttered?’ – is missing. The reasons for Darwin’s removal of this question will be discussed in the following chapter through investigating how Darwin handled the negative answers he received to it from Asia.<sup>40</sup> Like our study of Method 3: the recognition experiment, in Chapter 3, we will also find that Darwin intentionally hid some data that contradicted his presumptions.

#### Method 6: Observe animals and two other methods

‘Sixthly, and lastly, I have attended, as closely as I could, to the expression of the several passions in some of the commoner animals’ (Darwin 1872: 17). The ‘commoner animals’ for Darwin means the higher mammals. Throughout the book, Darwin’s own observations virtually all pertain to mammals, while observations of lower animals are mostly cited from secondary sources. For example, in Chapter II, illustrating the second principle, Darwin provides the antithesis expression of his own dog. In contrast, the lower animals raised in Chapter I, like frogs and insects, though not exhibiting observable expressions of emotions, are cited from elsewhere in order to discuss the heredity of instinct. The variety of animal species used for both instinctive and expressional behaviours implies that Darwin had been collecting information for the study for a long time, and this was accompanied by the work on social instincts published in the chapters of the *Descent of Man*. Thus, the six research methods can be understood in another way – as the sources for providing these expressive facts. From this perspective, there are two other methods frequently applied for this purpose, which we can call Method 7: Observe (healthy) adults, and Method 8: The literary approach. We have already been acquainted with the infant, adult and animal cases classified and quantified in the ‘*Observational cases*’ subsections in Part I, but most people are still unfamiliar with the literary approach – Darwin’s use of the works of fiction.

#### Method 8: The literary approach

<sup>39</sup> Freeman and Gautrey (1972, 1975) have made a textual comparison between these queries. The details of the other revisions are: the three-paragraph instruction at the end of the questionnaire that was sent out is condensed into one paragraph. In this paragraph, the words, originally in italic, ‘A definite description of the countenance’ were, returned to normal print in the published book. Third, the last two sentences in the 1867 query – ‘An answer within six or eight months, or even a year, to any single one of the foregoing questions would be gratefully accepted. In sending answers, the questions need not be copied, but reference may be made to the numbers of each query.’ – have been deleted. As Fig. 1.6 shows, in the 1867 version, the ‘even a year’ is marked off. As Darwin said, the questionnaires were sent out at the beginning of 1867 (1872: 15). This shows that Darwin aimed to get the responses by the end of 1867 or else in early 1868.

<sup>40</sup> A wider survey on all the letters Darwin received finds that the other continents show similar results to the answer types from Asia, so Asian messages are counted and summated in Chapter 2 to stand for the whole answer set. The discussion will include the following regions: China, Malaysia and Philippines; India and Sri Lanka; Australia and New Zealand.

The full range of the fictional sources will be summarized in Chapter 3, but for now I would just like to introduce a particular case. As an extreme sign of fear discussed in Chapter XI, Darwin mentions the erection of the hair. However, Darwin is only able to find human examples of this in poems. Darwin at first writes that, ‘Poets continually speak of the hair standing on end; Brutus says to the ghost of Cæsar, “that mak’st my blood cold, and my hair to stare.” And Cardinal Beaufort, after the murder of Gloucester exclaims, “Comb down his hair; look, look, it stands upright” ’ (p. 295). Still unsure whether the ‘writers of fiction might not have applied to man what they had often observed in animals’, Darwin then asked for information from Crichton-Browne on patients of his that were diagnosed as clinically insane. This clearly shows that the three poems are cited here simply because Darwin lacks evidence from other sources. It also explains why only one of the forty-four photographs sent from Crichton-Browne is used by Darwin in the book (see Fig. 1.4 above) – because Darwin merely selected the information serviceable for his inquiry but discarded the independent research.<sup>41</sup> This is similar to Darwin’s handling of other data, as will be shown in the next chapter in relation to the questionnaire.

### **Conclusion: problems and reflections on Darwin’s methodology**

After introducing the three principles and all the research methods/sources in the book, a curious and even surprising fact is discovered – that Method 3: The recognition experiment and Method 5: The questionnaire contribute nothing to Darwin’s discussion of the three principles. This is because, first, they do not appear in Chapters I to III as sources of examples or illustrations and, second, in the other chapters, they are never related to the three principles. Thus, the question of their function is raised. As forecasted above, Darwin’s use of these methods together with the literary approach will be dealt with in the following two chapters respectively. But before that, we still need to understand all the research methods/sources in Darwin’s expressional study as a whole. Their purpose can be seen through first looking at Darwin’s conclusions about each expression. Take the above expression – the erection of the hair – as an example. After three examples drawn from poems (Method 8) and one observation of the clinically insane from Crichton-Browne (Method 2), Darwin concludes that, ‘the fact of the hair becoming erect (in human) ... agrees perfectly with what we have seen in the lower animals’ (p. 296). Throughout the book, when discussing the observable expression in mammals, Darwin usually refers to the parallel

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<sup>41</sup> As Darwin finds, Crichton-Browne ‘had already attended to the subject’ – the expression – before his contact with Darwin (Darwin 1872: 14). So, most of ‘the copious notes and descriptions’ sent to Darwin are prior to and irrelevant to Darwin’s concerns (p. 14). Darwin’s concerns in his contacts with Crichton-Browne will be revealed in Chapter 3 through an analysis of their correspondence.

expression in humans, arguing that animal expressions are the ‘the causes, or origin, of the various movements of expression’ in humans (p. 17). Apart from this evolutionary association between animal and human expression (Methods 6 & 7), by using the other methods introduced above we can also see Darwin’s continual attempts to verify the unity of expression between the infant and the adult (Methods 1 & 7), animals and the clinically insane (Methods 6 and 2) and between different races (Method 5). Darwin’s pursuit of such unity explains the diversity in the cases provided by the eight methods/sources. We are then left wondering about what the ultimate conclusion is in the *Expression of Emotions*: the three principles or the unity of expression between animals and humans and between human races?

Almost all previous scholarship on the *Expression of Emotions* take the principles for granted because they are outlined and explained at the beginning of the book as its core findings. In contrast, Darwin’s final conclusion at the end of the book has been overlooked. The final paragraph of the book notes that, ‘We have seen that the study of the theory of expression confirms to ... the conclusion that man is derived from some lower animal form, and supports the belief of the specific or subspecific unity of the several races’ (p. 367). And also, in Chapter II of the *Descent of Man – Comparison of the mental powers of man and the lower animals* – the original intended location for the *Expression of Emotions*, Darwin’s consistent aim in the relevant research is stated:

‘My object in this chapter is solely to show that there is no fundamental difference between man and the higher mammals in their mental faculties. Each division of the subject might have been extended into a separate essay, but must here be treated briefly. As no classification of the mental powers has been universally accepted, I shall arrange my remarks in the order most convenient for my purpose; and will select those facts which have most struck me, with the hope that they may produce some effect on the reader’ (Darwin 1871: 35).

I would thus like to propose that the ultimate conclusion of Darwin’s expressional research is the existence of the unity of emotional expression, and the relation between this unity, the principles and the research methods can be best explained with the most popular methodology in science – hypothesis-deduction.

#### Darwin’s methodology in the *Origin of Species*

It is a prevalent belief<sup>42</sup> that Darwin’s methodology uses a hypothetico-deductive approach rather than Baconian induction. The distinction between these methods turns

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<sup>42</sup> See Ghiselin (1969); Mayr (1988); Eldredge (2005); and Ayala (2009).

on whether there is a presumed hypothesis to test (deductive) or a generalizing conclusion to be reached from empirical observation (inductive). In his autobiography, Darwin claims that he is a Baconian inductivist – ‘I worked on true Baconian (inductive) principles’ (Darwin 1958: 119; Ayala 2009: 10033) – and he further criticizes Herbert Spencer’s deductive method, observing: ‘His deductive manner of treating any subject is wholly opposed to my frame of mind’ (Darwin 1958: 109; Ayala 2009: 10034). Baconian induction was the prevailing methodology in British science at that time, as Hull (2003) notes, but many scholars have doubted Darwin’s self-declaration. According to Ayala (2009), the methodological determinant in the *Origin of Species* was Darwin’s postulation of the theory of evolution by natural selection. It has been ascertained that Darwin spent a long time gathering evolutionary evidence for organisms so, if natural selection occurred to Darwin prior to this process, then it should be viewed as a hypothesis subject to empirical testing; otherwise, if it came to Darwin after this process, then it would have been an inductive generalization from these observational facts. Historians studying Darwinian archives have found that the idea of natural selection arrived to Darwin in 1838, twenty-one years prior to the publication of the *Origin of Species*. Ayala (2009) argues that, during that time and until the end of his life, Darwin ‘relentlessly pursued empirical evidence to corroborate the evolutionary origin of organisms and to test his theory of natural selection’ (Ayala 2009: 10033).

A hypothetico-deductive model usually consists of three procedures: first, formulating hypotheses; second, logically deriving predictions from the hypotheses; and third, empirically testing the predictions by experiments or observations. Induction is necessary in these procedures, e.g. to formulate hypotheses. That is, the process of the hypothetico-deductive methodology does not reject the use of inductive reasoning. With this insight, the problem raised in discussing the *Expression of Emotions* – the relation between the unity and the principles – can be explained with the same model below.

#### The hypothetico-deductive model in the *Expression of Emotions*

‘Finally, with respect to my own observations, I may state that they were commenced in the year 1838; and, from that time to the present day, I have occasionally attended to the subject. At the above date, I was already inclined to believe in the principle of evolution, or of the derivation of species from other and lower forms. Consequently, when I read Sir C. Bell’s great work, his view, that man had been created with certain muscles specially adapted for the expression of his feelings, struck me as unsatisfactory’ (Darwin 1872: 19).

Darwin's statement above accords with his conclusion in the final paragraph that, 'We have seen that the study of the theory of expression confirms to ... the CONCLUSION that man is derived from some lower animal form, and supports the BELIEF of the specific or subspecific unity of the several races' (p. 367, my capitalization). I would like to suggest that the 'conclusion' and the 'belief' are two hypotheses in Darwin's expressional research – namely, the unity of expression between animals and humans and between human races. As introduced in Part II above, Method 5: The questionnaire is the only method that is concerned with comparisons between human races, so is the only means via which Darwin can corroborate (test) the second hypothesis. For the first hypothesis, the other methods are applied to show (test) the unity of expression in infants, adults, the clinically insane and animals. Within this process, Darwin amassed a large number of observational facts. The expressive behaviours that he collected were classified into three types, and the three principles were invented to mark and explain them. If there were predictions in Darwin's reasoning – which are not always necessary using the scientific method – they should be that the same mechanisms (the three principles) function in both human and animal expressions of emotions, and among different human races.<sup>43</sup>

Careful readers may have already noticed that above I use 'corroborate' and 'show' in relation to the hypotheses rather than using 'test', which is put in brackets. This is because during the late Nineteenth Century, Darwin and his contemporaries were not trained to follow the scientific method common to us nowadays. Rather, as a naturalist, Darwin was inclined to select the positive data that accorded with the hypotheses and presented them in his book. This may be the reason for the removal of Question 16 from the original query. This problem will be addressed further in the following chapter by looking at Darwin's treatment of the negative data received through Method 5: The questionnaire.

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<sup>43</sup> In the concluding chapter, I will discuss whether and how this prediction was tested by Darwin using Method 3: The recognition experiment and Method 5: The questionnaire.

## **Chapter 2 Darwin's Questionnaire in Focus: How Darwin's Asian Data Throws Light on a Dropped Question**

Chapter 1 provided a general account of Darwin's naturalist methods for collecting data to study emotional expression. Thanks to the preservation of Darwinian letters, we can examine his practice with one method in particular – Method 5: The questionnaire. As already noted, the expressional questionnaire was specially designed to test the second hypothesis on racial universality: 'Fifthly, it seemed to me highly important to ascertain whether the same expressions and gestures prevail, as has often been asserted without much evidence, with all the races of mankind, especially with those who have associated but little with Europeans' (Darwin 1872: 15). Darwin sent fifty copies of the questionnaire out to his global informants, asking participants for seventeen expressions of emotions from their local races. This chapter compares the answers to the questionnaire with Darwin's citations of them, and finds that a good number of messages that were contradictory to his hypothesis on the universality of emotional expression had been discarded by the time of publication. They form part of Darwin's publication bias in the *Expression of Emotions*. Publication bias<sup>44</sup> is a common phenomenon in scientific research, whereby scientists intentionally report results that support their hypotheses whilst hiding the ones that don't. As a case study of this problem in regard to Darwin's questionnaire survey on expression, this chapter focuses on one certain region, Asia, with particular interest in China. The neglected information in the Asian letters will be discovered and classified. The process of doing so will enable us to answer why the 16<sup>th</sup> question on hissing is deleted in the published version of the *Expression of Emotions*.

Among Darwin's informants in Asia, only one was working in China, a British diplomat, ornithologist and botanist called Robert Swinhoe. Our story starts and ends with Swinhoe's observations of Chinese expressions. His communications with Darwin are introduced in Part I: *Robert Swinhoe as Darwin's informant in China: the constraint in their Sino-British network*. Swinhoe got in touch with Darwin on the basis of his ornithological study whilst, within the botanical community, he was in contact with Joseph Hooker and other diplomats. His activities in each community are separately introduced to enable us to draw a full map of the Sino-British network in the late Nineteenth Century. A comparison between Darwin's and Hooker's China

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<sup>44</sup> Publication bias was first proposed by Begg and Berlin (1988) with respect to understanding medical data. It is a tendency that has been criticized for giving a false impression of the strength of results, notably in medicine, but also in other areas, such as biological research on gender differences, which may overstate gender superiority. Gould (1993) also summarizes some examples of publication bias in researching gender distinctions.

networks reveals the constraints Darwin faced with data collection that may have limited his access to information about Chinese expressions.

In order to examine the outcome of the Sino-British network, the second part looks closely at Swinhoe's communications with Darwin on expression. Because Swinhoe's observations were instructed by the fixed questionnaire, his answers are quite limited. By contrasting Swinhoe's answers to the query with Darwin's citations of them, five characteristics of Darwin's citation habits and the way that he neglected information on racial distinction are discovered through a classification system. This serves as an overture for Part III, which investigates the larger pattern of publication bias in all the Asian answers.

Part III looks at *Darwin's selective handling of the Asian data as part of a larger pattern of publication bias*. It extends the discussion from China to the scope of Asia. First, the Asian answers are quantified to give a general view of the data, showing a coincident correlation with modern psychological achievement. Second, the neglected information from the letters, including racial distinction and cultural impacts on expression, is summarized to give a fuller picture of Darwin's publication bias. The reason for the removal of Question 16 on hissing is figured out here.

Having seen the constraints on the Sino-British network in Part I and Darwin's publication bias in Parts II and III, we then need to consider what we can expect from an unconstrained observer. Swinhoe, apart from his formal answers to Darwin's query, had already published work on Chinese expression, which he had earlier sent to Darwin. This book is introduced in Part IV: *A better report from Swinhoe as a correction to Darwin's publication bias*. The content of the book not only expands on the information provided in the letters, but also includes other findings on social and cultural interpretations of emotional expression.

Finally, I will conclude by considering how the shortcomings in the Sino-British network had effects on both sides: it led to limited answers to the query and Darwin's selection of positive data (data that fit his hypothesis). Publication bias exists in Darwin's handling of the data and is rooted in the process of its collection. The negative information in the letters consisted of two broad types. The first is that which breaks down the uniform emotional types listed in the questionnaire. The second, more significantly, is that which undermines the hypothesis of racial universality.

**Part I: Robert Swinhoe as Darwin's informant in China: the limits of their Sino-British network**

This part comprises two sections, starting with an examination of Swinhoe's relationship with Darwin and then extending this to the whole Sino-British network. To evince the meanings of their communications, Swinhoe's multiple roles are disentangled in Section 1: *Darwin's informant in China: Which Swinhoe?* Section 1.1 concerns Swinhoe's career as a diplomat, sketching the routes and scope of his consular service in China. Section 1.2 then summarizes Swinhoe's main achievements in ornithology – the basis for his initial contact with Darwin. Next, Section 1.3 considers the botanist's role in extending their relationship to the broader scientist-diplomat network that brought other botanists into the relationship, e.g. Joseph Hooker and Henry Hance, and explains why Swinhoe was better-funded as a botanist than as an ornithologist. Section 2: *The British scientist-diplomas network in the late Nineteenth Century* then summarizes the characteristics of the scientist-diplomat network in relation to the flow of materials, i.e. specimen, money and information. Finally, it concludes by considering the constraints within the information exchange between Darwin and Swinhoe.



## 1. Darwin's informant in China: Which Swinhoe?

### 1.1 A diplomat in China



Fig. 2.1 Robert Swinhoe (circa 1863) (Collar 2004: 51)

Robert Swinhoe (1836–1877) was born in India, and moved with his parents to England when he was five years old (Fisher 2004). Just before finishing his first year at King's College London, Swinhoe dropped out to enlist in the consular corps<sup>45</sup> that were stationed in China. After a short training period in 1854, the 18-year-old Swinhoe was sent to the new colony Hong Kong as a temporary interpreter (Takao 2013). Swinhoe's diplomatic career began when he was formally appointed to Xiamen City<sup>46</sup> the next year.

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<sup>45</sup> Ordered by the British Foreign and Colonial Office.

<sup>46</sup> Xiamen City was called Amoy at that time, and is a southern port city in Mainland China.

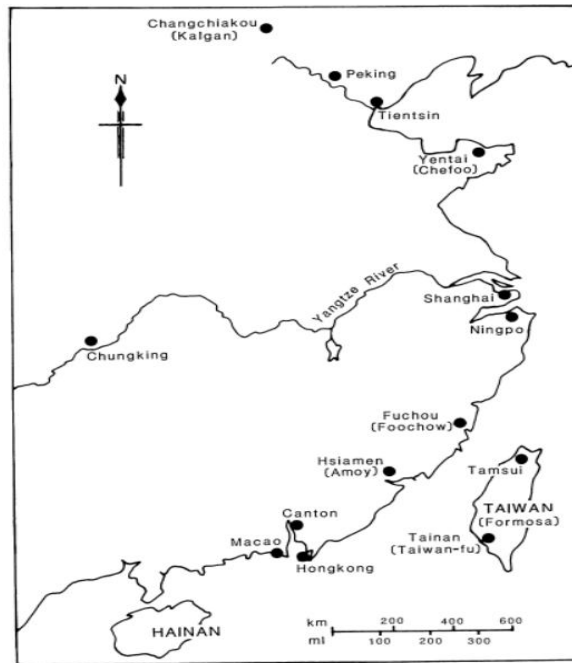


Fig. 2.2 Map of Swinhoe's routes in China (Collar 2004; Hall 1987)

During his time in Xiamen, Swinhoe visited Taiwan twice. In his second trip there in 1856, two years after his first, he acted as an interpreter on the HMS *Inflexible*, sailing from Xiamen to Taiwan to look for missing soldiers (Fisher 2004). In 1860 he took part in the Second Opium War,<sup>47</sup> acting as the interpreter of General Napier. At the end of this year the 24-year-old Swinhoe was appointed Vice-Consul in Taiwan, making him the first foreign diplomat there. His consular service in Taiwan included some ground-breaking achievements: he moved the British Consulate from Tainan-fu (Tainan)<sup>48</sup> to the northern port Tamsui (see Fig. 2.2 above), and established the first tea trade line between Taiwan and Britain. He returned to London in May 1862 due to illness.

In 1863, Swinhoe returned again to Taiwan, and continued to explore the country. Two years later, he was promoted to the position of Principal Consul, and was transferred to Xiamen in 1866 and then to Ningbo<sup>49</sup>. That was why Darwin called him H.M. Consul in the credit lists of the *Expression of Emotions*. After his official exploration of Hainan, the second largest island in South China, Swinhoe's consular service shifted to

<sup>47</sup> After this war, Swinhoe published his war diary in 1861 as the *Narrative of The North China Campaign of 1860* (referred to as *Narrative* hereafter). Its content will be discussed in Section 8.

<sup>48</sup> Tainan-fu (now Taipei) was the prefectural capital of Taiwan at that time. In the Chinese language, 'nan' means south while 'pei' means north.

<sup>49</sup> Ningbo (Ning-po at that time) was in the first batch of five treaty ports opened under the 1842 Treaty of Nanjing that ended the first Opium War. At that time Ning-po was an important trading centre of celadon porcelain, which was in great demand in Victorian England.

the North. In early 1869 he joined an expedition along the Yangtze River<sup>50</sup> to survey ship routes (see Fig. 2.2). After this journey, he again became ill, and took sick leave for eighteen months. As he mentions in a letter to Darwin, his way back to England took him via Japan and America through the Trans-American Railroad (Hall 1987: 45).

After returning to Ningbo in China, Swinhoe suffered from paralysis and moved to Yantai<sup>51</sup> in 1873, a northern city port<sup>52</sup> (Collar 2004). He retired in 1875 and finally resided in London. One year later, with Darwin's backing, he was elected as a fellow of the Royal Society. On 28 October 1877, he died at home: 33 Carlyle Square, Chelsea, London. His routes in China are summarized in Table 2.1 below. The first column gives dates and durations; the second column his locations; while the third provides details on his consular work.

Table 2.1 Timeline for Swinhoe, amended from Collar (2004)<sup>53</sup>

Year	Place	Remarks
1854	Hong Kong	Studying Chinese.
1855–1860	Xiamen (Amoy)	With voyages to Taiwan in 1856 and 1858 and military service in northern China from April to November 1860.
1861–5/1862	Taiwan	Appointed as the vice-consul here.
9/1862–late 1863	England	Sick leave.
2/1864–5/1866	Taiwan	Promoted to Consul.
5/1866–end of 1867	Xiamen	
29/1–4, 1868	Hainan	Coal mines survey.
5/1868–3/1869	Peking	
3–7, 1869	Yangtze River	Expedition for ship lane.
7–9, 1869	via Japan, America	Journey back to England.
9/1869–4/1871	England	
5/1871–2/1873	Ningbo	Suffered from paralysis
4/1873–1875	Yantai	Winter in Shanghai, 1875, and left from there.
10/1875–28/10/1877	England	Address in London was 33 Carlyle Square, Chelsea.

<sup>50</sup> Also called Changjiang River, the longest river in China, that flows from the western Himalayas to the East China Sea.

<sup>51</sup> A northeastern city in Shandong Province with mountain and coastline.

<sup>52</sup> This port was praised by Swinhoe as being the 'Scarborough of China'.

<sup>53</sup> This is based on Swinhoe's correspondence and archives. Some items are supplemented to the timeline produced by Collar (2004).

Fig 2.2 above shows that Swinhoe's consular service in China was mostly located in the South, and Table 2.1 suggests that his most important achievements were made in Taiwan, where he was appointed as Principal Consul. Compared to the temporally continuous and geographically close services in the South – mainly in Taiwan and Xiamen – his activities in the North were intermittent: in 1860, he was an interpreter during the Second Opium War; in 1868, he transferred to Beijing for a few months; and finally, from 1873 to 1875, he was resting at Yantai.

Alongside Swinhoe's consular service, his far-ranging and in-depth travels in China, particularly in Taiwan, had led to his discovering many new species of both flora and fauna. These scientific findings helped to shape Swinhoe's other roles as an ornithologist and botanist, laying the ground for his contact with Darwin.

### *1.2 A well-known ornithologist*

Soon after his first arrival in China, Swinhoe began to study zoology. Both his consular career and zoological research peaked during his time in Taiwan, where he discovered a number of new bird species. His research activities were conducted alongside his diplomatic service – for example, during his first trip to Taiwan in 1856, Swinhoe made his first ornithological collection. Becoming immersed in ornithology, the diplomat Swinhoe entered into the zoological arena. Two years later, his first article 'Remarks on the fauna of Amoy' (1858) was published in the journal *Zoologist*. During his second trip to Taiwan, when he was officially interpreting on the HMS *Inflexible*, Swinhoe squeezed used his spare time to discover a large number of new species, founding his fame and status in zoology (Fisher 2004). Consequently, four years later, he was elected as a fellow of the Zoological Society in London because his work by that time had identified 201 new Chinese birds.<sup>54</sup> Even when he was interpreting in the Second Opium War, he managed to take notes on ornithology<sup>55</sup> at the hardest of times<sup>56</sup> (Swinhoe 1861).

Darwin had contacted Swinhoe when the latter was a junior zoologist. Their earliest contact we know about involved some bird-skin specimens sent from Swinhoe to Darwin, which were accounted for in Darwin's memorandum dated December 1855.

<sup>54</sup> His 1863 book *Catalogue of the birds of China, with remarks principally on their geographical distribution* catalogues 454 species. The newly identified kinds in his lifetime numbered 227.

<sup>55</sup> The notes were published in the *Zoologist* in 1861 as the *Notes on ornithology taken between Takoo and Peking, in the neighbourhood of the Peiho River, Province of Chelee, North China, from August to December, 1860*.

<sup>56</sup> According to Swinhoe's *Narrative* (1861), the march between Takoo and Peking (see the article title in above footnote) was the hardest and busiest time for the British corps during the war.

When working in China, Swinhoe kept on providing Darwin with animal specimens and observational evidence to verify the latter's theories. Their communications contributed to Darwin's thinking in the *Origin of Species* (1859), the *Variation under Domestication*<sup>57</sup> (1868), the *Descent of Man* (1871) and finally the *Expression of Emotions* (1872). Swinhoe was acknowledged in all of these books, and received their first editions.<sup>58</sup> Their contact, on Swinhoe's side, was related both to his zoological study and his consular duty<sup>59</sup>.

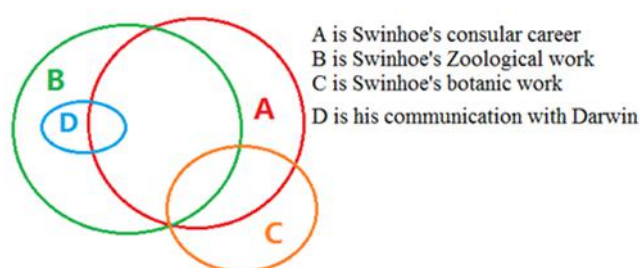


Fig. 2.3 Swinhoe's three roles – Which Swinhoe did Darwin communicate with?

Darwin and Swinhoe's communication concerned zoology from the start, and mostly centred on Swinhoe's ornithological study. As Fig. 2.3 above shows, ornithology played a major role in their exchange of ideas, specimens and books within zoology. The A, B, D overlap represents the themes or subjects that their communications focused on, with expression (D) being bound with both Swinhoe's consular (A) and zoological life (B). For example, when Swinhoe interpreted in the war (A), he took notes on ornithology<sup>60</sup> (B), and sent Darwin a copy of his *Narrative* (D).<sup>61</sup> And during his official survey to Hainan (A) in 1868, Swinhoe enriched his collection with the 'Fork-tailed Sunbird'<sup>62</sup> and 21 kinds of mammals, including the 'Lepus hainanus Swinhoe' (Swinhoe 1870). He published the first ornithological paper focusing on Hainan<sup>63</sup> (B). In the meantime, he recorded the customs and expressional habits of the

<sup>57</sup> The *Variation under Domestication* acknowledges that Swinhoe had sent Darwin a dovescot-pigeon from Foochow. It was sent with Swinhoe's 12 November 1862 letter, noting that some of his collections can confirm Darwin's theory of the origins of species.

<sup>58</sup> In September 1866, when Swinhoe was in Xiaman, Darwin sent him a copy of unpublished *Variation under Domestication*.

<sup>59</sup> They also corresponded when Swinhoe temporarily rested in England, compiling his previous findings. Four letters were sent to Darwin during that time, mainly related to the *Descent of Man*.

<sup>60</sup> See Footnotes 55 and 56 above.

<sup>61</sup> This book also records the Chinese expressions, which will be discussed in Part IV.

<sup>62</sup> He collected three specimens of this kind, one of which was from Limu Mountain on 23 February 1868.

<sup>63</sup> This paper was published in 1869. In addition to a general summary of known species in Hainan, *On the Ornithology of Hainan* was published by Swinhoe in 1870. He used extracts from the local government chorography – 'Kiung-shan-Heen Che' 《琼山县志》 in Chinese.

aborigines of Hainan – the Li people<sup>64</sup> –,informing Darwin about their nervous expressions and how they were easily frightened<sup>65</sup> (D). Even more common is the AB overlap. For instance, in the next year’s consular expedition along the Yangtze River (A), Swinhoe found the ‘Yangtze giant softshell turtle’ (B), also known as the ‘*Rafetus swinhoeii*’.<sup>66</sup>

Throughout the course of his life Swinhoe published over one hundred and twenty papers and articles, documenting a vast number of birds,<sup>67</sup> butterflies, moths and mammals (Fisher 2004). Many of them were named after Swinhoe, among which the most well known is ‘Swinhoe’s pheasant’ (*Lophura swinhoii*), because it was once considered to be the most beautiful bird in the world (see Fig. 2.4 below). He also named a subspecies<sup>68</sup> after Darwin in 1872, the ‘*Pucrasia macrolopha darwini*’ (Hall 1987). With all these findings and achievements, and backed by Darwin, Swinhoe was elected as a fellow of the Royal Society in 1876.<sup>69</sup> So, from the beginning to the end of their relationship, Swinhoe contacted Darwin chiefly in the role of ornithologist. Swinhoe’s younger brother, Charles Swinhoe (1836–1923), also became a naturalist, collecting birds in Afghanistan (Fisher 2004).

During his consular service in China, not only did Swinhoe collect specimens but he also sent live animals to England, some of them to London Zoo<sup>70</sup> (Hall 1987). Swinhoe’s incentive to do so, and the constraints in his scientific research, will be discussed below in relation to his role as a botanist.

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<sup>64</sup> Li people are the southernmost located of China’s fifty-six peoples, and their history can be traced back to the Neolithic Era. Han people began to migrate to this island two thousand years ago.

<sup>65</sup> Swinhoe wrote this in a letter to Darwin on 4 August 1868, with his answers to Darwin’s query on emotion.

<sup>66</sup> This was sent to John Edward Gray in 1873, who was the Keeper of Zoology at the British Museum in London.

<sup>67</sup> Bird collections number 3,700, with most of them being stored at the Natural History Museum in Liverpool.

<sup>68</sup> Although they were a species at that time.

<sup>69</sup> The last two letters from Swinhoe to Darwin were written on 14 January and 9 February 1874, and were sent from 33 Carlyle Square, London. Both of them relate to Swinhoe becoming a member of the Royal Society.

<sup>70</sup> The first Pere David’s deer in Europe was sent by Swinhoe from Taiwan.



Fig. 2.4 Swinhoe's Pheasant (Takao 2013)<sup>71</sup>

### 1.3 A better-funded botanist

Fig 2.3 above suggests that Darwin's communication with Swinhoe (D) went beyond Swinhoe's botanical research (C) because, in all their reserved correspondence, there was no exchange on flora. Notwithstanding that, Swinhoe's botanist role avails us with an opportunity to examine the funding flow in the broader Sino-British network with other naturalists, such as the most famous British botanist of the Nineteenth Century, Joseph Hooker (1817–1911), and Swinhoe's diplomatic colleague, Henry Fletcher Hance (1827–1886). Swinhoe and Hance were Hooker's main informants in China. Hance preceded Swinhoe in South China,<sup>72</sup> and enlightened the latter's interest in botany. In contrast to Swinhoe's preference for ornithology, Hance's spare time was devoted to botanical study. Like Swinhoe, Hance's naturalist achievements were more famous than his professional consular service. Unlike Swinhoe, Hance did not conduct fieldwork himself, but built networks connecting with his colleagues around 1840–50. When new staff arrived at Hong Kong or Canton to learn Chinese, Hance encouraged them to study botany and send specimens to him for cataloguing (Fan 2004: 197). By doing so, he collected 22,437 kinds of plant specimens<sup>73</sup> and gained a reputation among those naturalists. Many of his specimens went to Hooker, the Director of the Royal Botanic Gardens at Kew at that time ('Kew Gardens', for short, hereafter).

<sup>71</sup> By J. Fenwick Lansdowne, taken from the 'Rare Birds of China' portfolio (Courtesy of the Clodius Corporation).

<sup>72</sup> Like Swinhoe's diplomat career and research in China, Hance's was also centralized in the South. Hance mainly worked in Whampoa in Hong Kong, and his career ended at Xiamen as the acting consul. During his service in China, Hance administered Swinhoe's work for most of the time.

<sup>73</sup> Hance's main work was published as the *Flora Honkongensis: A comus supplement to Mr. Benth's description of the plants of Hongkong* in 1872.

Darwin's and Hooker's contacts with these diplomats and naturalists – i.e. their networks in China – are illustrated in Fig. 2.5 below. The yellow lines represent Hooker's contacts with those botanists in China, while the blue lines indicate Darwin's network.

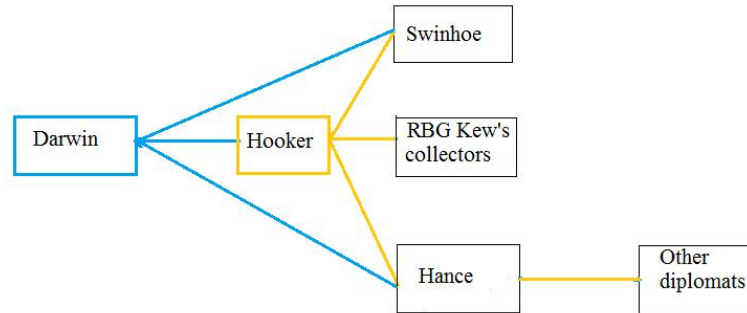


Fig. 2.5 Darwin's and Hooker's networks in China

As the middle yellow line reveals, apart from receiving these diplomats (amateur naturalists), Kew Gardens also sent official collectors to China, with Richard Oldham (1837–1864) being the last one. The yellow lines also show money flows from Hooker – who before 1865 was assistant director at Kew Gardens<sup>74</sup> – to those collectors. The official collectors received a fixed salary and small grants to cover necessary costs, while diplomats like Hance and Swinhoe could sell their collections at negotiable prices and benefit from the quantity of specimens. The status of these official collectors was rarely as enviable as that of diplomatic naturalists, because they were employed in posts that were ill-paid and received dull administrative tasks as well. For example, Oldham and his predecessor Charles Wilford were both dismissed due to delays in sending specimens back to Britain.<sup>75</sup>

When requesting funds from Kew, Swinhoe usually asked for money to cover the costs of carriages rather than clearly marking a price for specimens, and reading the letters between Swinhoe and Hooker, we can grasp that he often vacillated between the role of a noble scientist and the status of needing financial support – an epitome of those supernumerary naturalists. Such statuses and contacts continued to exist after Swinhoe's retirement, and even continued to his younger brother J. Swinhoe who, at

<sup>74</sup> Hooker served as the Assistant Director of Kew from 1855, and received the directorship from his father William Hooker in 1865. For more information about Hooker's contacts with Darwin, see Rice (2009). For the role of Kew Gardens in scientific exchanges with colonies, see Brockway (1978).

<sup>75</sup> Their plight and conflicts with Hooker can be seen in Rowley (2011) and Fan (2004: 129).



that time, also worked for Hooker in China<sup>76</sup> (Swinhoe 1874). These diplomats, commonly lacking money for their exploration, had to cash-in on their discoveries along their journeys. During this time, Hooker and Louis Fraser,<sup>77</sup> as the conscientious directors of national gardens and museums, provided the best options for financial help. In this sense, Hooker and other entitled scientists played an important role in supporting the inchoate colonial scientific research, but could have played more of a role. A noteworthy fact is that those collectors were only paid for providing specimens rather than information. To unblock the lack of the latter, it is useful to compare Hooker's network (the yellow lines) with Darwin's (the blue lines) from Fig 2.5 above.

As already mentioned, the blue lines indicate the flow of information and specimens only, whilst the yellow lines also indicate the flow of money. So why was the botanist Swinhoe better funded than his ornithologist role? Among Swinhoe's heritage that is now stored at the Natural History of Liverpool Museum, there are a mass of bird specimens and a much smaller number of plants, because most of his plant collections had been sold before his death. In comparison to the flora industry, Swinhoe's financial benefit from his bird collections was low, being far from proportional to its size and fame. This was partly due to Darwin's status – since Darwin was not administrating any public organization, he was thus without funding or any obligation to purchase specimens. Thus his connection with Swinhoe, Hance and Hooker did not have a financial dimension. Swinhoe could sell his plants to Hooker and Fraser<sup>78</sup> but, with regards to fauna, live animals were much more popular to trade than specimens. This was the incentive for Swinhoe to regularly send animals to London Zoo.<sup>79</sup>

Swinhoe's consular service in China facilitated his pursuit and achievements in botany and zoology, and his naturalist roles linked him with Hooker and Darwin in their relevant fields. Darwin got to know Swinhoe through zoology, and later consulted him on expression. In other words, Darwin knew Swinhoe the ornithologist better than Swinhoe the diplomat or Swinhoe the botanist. Their communication was part of the broader Sino-British network in the late Nineteen Century, and we now turn to examining the possible constraints in this network, especially those on information exchange.

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<sup>76</sup> After inquiring to Swinhoe about the climate and temperature in Shanghai, Hooker intended to send some seeds there for him to plant. Replying on 15 April 1874 from London, Swinhoe recommended his younger brother J. Swinhoe take this job, and in the same letter he appealed to sell some plant specimens to Kew Gardens that he had collected in Northern China.

<sup>77</sup> Louis Fraser was the curator of the Museum of the Zoological Society of London. On 31 December 1867, in a letter to Hooker, Swinhoe explained that it was the captain who sold the plants to Louis Fraser that was supposed to be delivered to Hooker (Swinhoe 1867a). We can perceive Swinhoe's predicament in his reply to Hooker's request.

<sup>78</sup> *Ibid.*

<sup>79</sup> See Footnote 70 above.

## 2 British scientists-diplomats network in the late Nineteen Century

### 2.1 An independent network

A careful reader may have perceived that the blue (zoological) and yellow (botanical) lines in Fig. 2.5 above do not cross each other, indicating that all these correspondences were separate. Firstly, the zoological and botanical lines do not cross because zoologists and botanists exchanged ideas and specimens respectively in their own circles. Darwin held separate discussions with each group. His works were more popular with fauna than with flora researchers. In contrast to Swinhoe's complete acceptance and support for Darwinian evolution, Hance and other botanists expressed doubts (Fan 2004: 72). This shows the different understandings of or attitudes towards Darwinian theory that existed between the two circles.

Secondly, unlike the zoological lines, the botanic lines themselves do not cross. Fa-ti Fan, in his *British Naturalists in Qing China* (2004), aims to demonstrate that an informational kingdom existed among the diplomats who were amateur naturalists. Nevertheless, the results reveal that their inside scientific exchanges seldom concerned information or funding, but rather concentrated on specimens. This is evidenced by Hooker's network with Swinhoe and Hance although, as colleagues, they reported to Hooker separately, and did not transfer funding from him. In the zoological circle connected with Darwin, the situation was almost the same. On 4 August 1868, Swinhoe wrote to Darwin from Peking, telling him that there had been no response to the expressional query that he had published the previous year in the Hong Kong journal *Notes and Queries in China and Japan* (Swinhoe 1868). Interestingly, one month later, Hance sent a letter to Darwin from south China<sup>80</sup> recommending he use the same journal (Hance 1868). However, in these letters, Hance and Swinhoe did not mention each other, and Hance made no contribution to Darwin's query on expression. This shows that the scientific network that existed between these diplomats was very loose, and independent of geographical connections due to messaging limitations. Even within the same community, there were seldom any cooperative papers, findings, or transfers of funding between botanists and ornithologists, for example. How then were they connected? What kind of link existed between them?

As mentioned above, Hance encouraged junior diplomats to study botany and send plants to him for cataloguing. The bottom yellow line in Fig. 2.5 suggests that, from right to left, the junior collectors sent specimens to Hance – the delegate of Hooker –

<sup>80</sup> From the British Vice Consulate in Whampoa, a district in Canton (see Fig 2.2 above).

and these finally got passed to Kew Gardens. This shows that these amateur botanists were mainly connected in time and grade sequence under their consular duties. The consuls who arrived earlier at legations often fostered the successors' scientific interests and built up networks to connect them, as Hance did in botany. In the zoologist community, Swinhoe had instructed H.F.W. Holt to collect and construct bird specimens (Fan 2004: 74). Taking the two communities as a whole, we can see that their scientific research proceeded with their consular progress, including an extension to exploring China and moving consular offices. For instance, in an 1869 expediting along Yangzi River, Swinhoe extended the ship lane upstream to Yichang – a new treaty port – to install a consular office. Later, in the 1880s, Augustine Henry undertook botany research there and corresponded with Hance (Fan 2004: 76). Moreover, William Hancock's surveys in Tamsui and Hainan also followed Swinhoe's explorations there. In this sense, Swinhoe's routes in China (see Fig. 2.2 and Table 2.1 above) not only drew out a map of consular and trade development, but also epitomized British diplomats' naturalist studies. In summary, knowledge and skills of natural history were passed on to young diplomats from their predecessors (administrators). However, after being assigned to new consular legations, their scientific research was not closely associated with that of their fellow diplomats, and instead they held independent contacts with Britain-based scientists, like Darwin and Hooker. Nonetheless, they still stepped on the same map of consular service in time sequence.

## *2.2 A non-equivalent network centred on Britain*

Having summarized the connections that British diplomats in China held at this time, it is now useful to see their exchanges with inland scientists, such as Darwin and Hooker. Were there any constraints in this Sino-British network that might have limited Darwin's access to information on Chinese emotional expression? To answer this question, we need to outline the output and input of Swinhoe's scientific research in relation to Britain. By inspecting how matters and messages flowed between the two, we can identify the possible constraints on both sides.

### The input and output of Swinhoe's research: a summary of the above findings

The first items of Swinhoe's research to consider are his specimens. The inputs of Swinhoe's specimens are those that he collected in his fieldwork,<sup>81</sup> and a few that were

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<sup>81</sup> See Section 1 – his fieldwork was conducted both during and outside of his consular duty (see Fig. 2.3 in Section 1.2).

received from his colleagues to catalogue<sup>82</sup>. The ‘output of his specimens’ were those that he sent to Darwin, Hooker, London Zoo, and so on. The second item is money. It flowed one-way – from Britain to Swinhoe, who was paid by Hooker and the London Zoo for a small part of his collection. The last exchange involved information, including instructions and observations. Swinhoe exchanged ideas with Darwin and Hooker, and made the observations that they requested. The input to and output by Swinhoe is presented in Fig. 2.6 below, which demonstrates the broader flows of the three items in the Sino-British network. The left side of the figure represents the inland scientists such as Darwin and Hooker, whilst the right side represents Swinhoe-like diplomats and amateur naturalists working in China. The top yellow arrow stands for the flow of specimens to Britain from diplomats. The second yellow arrow represents the money that was paid for their collections. Its smaller size and boundary compared to the larger, unbounded arrow for specimens shows that many specimens were not paid for. The two blue arrows at the bottom symbolize the information exchange between the inland scientists and the diplomats. Similarly, their sizes and boundaries denote that diplomats contributed much more to these scientists’ work than they received in return (see Section 1.2 in the acknowledgements to Swinhoe in Darwin’s serial books).

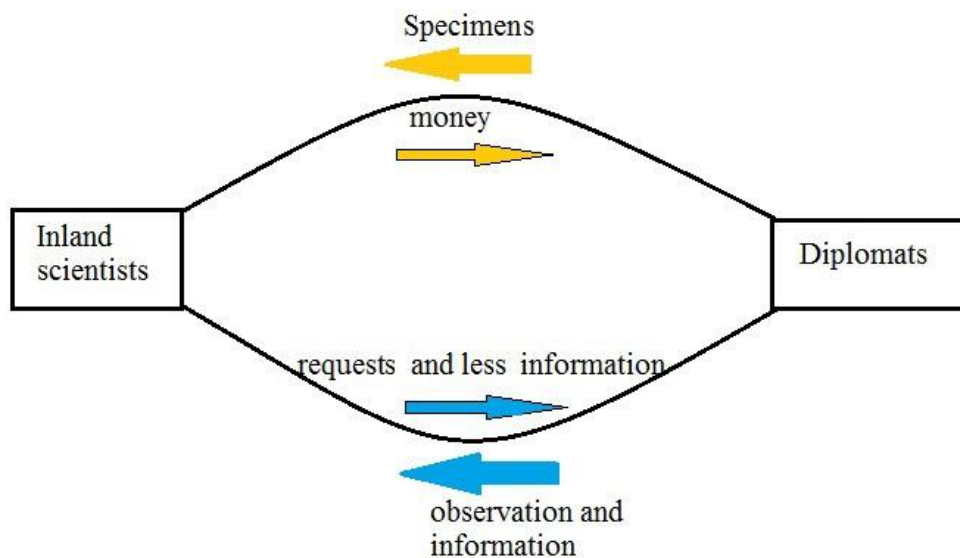


Fig. 2.6 The three flows in the Sino-British network for late Nineteenth Century science: A non-equivalent network

In summary, there were three flows in the Sino-British network in the late Nineteenth Century between inland scientists and diplomats: specimens, money and information.

<sup>82</sup> These colleagues were not usually financially reimbursed, but won the chance to name the species (Fan 2004).

The first two (symbolized by yellow arrows) were one-way – specimens only went from China to Britain while money only went in the reverse direction. Another noteworthy fact is that the information exchange denoted by the blue arrows was irrelevant to money – the diplomats were only paid for physical specimens, not for information or observations. Moreover, the arrows (money and information) from inland scientists to diplomats are much smaller in size than the reverse ones, showing that the payments and information flowing to diplomats were not equitable for the amount of work they undertook. That is, the diplomats found themselves in passive positions within these networks for two different reasons. Firstly, although the diplomats were active in collecting specimens, most of their fieldwork, collections and discoveries were not funded. Secondly, the information flow mainly went from China to Britain, especially to those top scientists like Darwin and Hooker, who consulted diplomats individually. Their communication mainly served the leading scientists' interests in gathering data and verifying their theories. In this respect, the scientist-diplomat connection basically centred on the former. As already mentioned in Section 2.1, the scientific network of the diplomats was very loose in that there were seldom cooperative findings made within the community. Swinhoe, for example, made no co-discoveries, published no co-authored papers, nor financially benefitted from joint enterprises with his colleagues. Thus, the overall scientific network was centred on the inland scientists, and radiated to these diplomats independently.

### *2.3 The constraint on Swinhoe and Darwin's Network: on the significance of Swinhoe's social position for his science and vice versa*

I would now like to discuss a possible constraint on the above network. In the funding flow, these diplomats were not well paid, because regular market-to-trade collections did not exist. Although they could enjoy their communications with these prominent scientists within this information flow, the inland scientists faced the challenge that the transition of information was often delayed and indirect. Since diplomatic agents were not primarily responsible for scientific research, their official duties could hinder on-time responses to those scientists. A comparison between Darwin's and Hooker's networks reveals that one delegate in China was beneficial for organizing scattered collectors. Apart from Kew's official collectors, Hance was Hooker's principal delegate for associating with the other amateur botanists, and Hance received regular funding to guarantee Hooker's access to China's flora kingdom. Hooker, in return, received an ongoing supply of specimens and closer contact with diplomats – i.e. the naturalist community. The success of Hance and Hooker's network serves as a foil to the limitations exhibited by Darwin's network. Without an administrative position, there was no official grant for Darwin to sustain a fixed deputy in a distant country.

His contacts with remote areas were based on personal and independent relationships, and relied on volunteers. This limitation affected his expressional investigation as, although he encouraged respondents to provide detailed answers in each questionnaire he sent out, plenty of ‘yes’ or ‘no’ answers were received, and thus lacked the level of depth he sought.

Another possible constraint of the Sino-British network is that, since it centred on inland scientists, the diplomats and Darwin’s other informants were directed by the pre-existing concerns and frameworks of the centre. As mentioned in Chapter 1, the evidence collected in the *Expression of Emotions* serves to corroborate the presumed hypotheses – the evolution and universality of emotional expression – with Method 5: The questionnaire being specially designed to support the second hypothesis regarding the universality of expressions. As part of the global survey on native expression, Swinhoe’s investigations in China were also made from within the established parameters of Darwin’s framework. There were two potential problems with there being a fit here, however. First, Swinhoe’s observations could have been directed by the questionnaire. Second, Darwin may have selected the positive answers that accorded with his beliefs. The following parts will investigate whether these risks translated into reality, as well as looking at the constraints on the Sino-British network by examining the outcome of Swinhoe’s interactions with Darwin on expression.

## **Part II: Swinhoe’s communication with Darwin on expression**

Darwin’s questionnaire was sent to Swinhoe in 1867. After receiving it, four of Swinhoe’s letters to Darwin related to the expression of emotion, with the last one in 1873 responding to the published book. This part of the chapter includes two sections. Section 3 outlines and examines the content of the first three letters that answer Darwin’s questionnaire. Section 4 explores how Swinhoe’s findings are engaged with in the *Expression of Emotions*, analysing Darwin’s handling of them. Swinhoe’s comments on the book and the omission of information from his answers will also be summarized and analysed.

### **3 Swinhoe’s findings on expression in response to Darwin’s query**

#### *3.1 The first letter on racial and social differences*

Darwin’s questionnaires were sent out to informants in or around February 1867, and took three months to be delivered to Swinhoe. As Table 2.1 notes, Swinhoe was

residing in Xiamen,<sup>83</sup> South China in 1867. After receiving the questionnaires, Swinhoe used two methods to seek respondents for them. The first was an advertisement providing the information that the questionnaire and Darwin's instructions for answering it were published in the Hong Kong journal, *Notes and Queries on China and Japan*, dated 31 August 1867. As Fig. 2.7 below shows, the advertisement was titled 'Signs of emotion amongst the Chinese'. Swinhoe made the following entry to introduce the questionnaire: 'The following Queries have been addressed to me by a friend in England. He wishes them to be applied to the expression displayed under various emotions by the Chinese or by any other outlandish race. Some of your readers may find leisure to record their observations on this subject in *Notes and Queries*. I give my Querist's own words:' (Swinhoe 1867b: 105).

Aug. 31, 1867.]	NOTES AND QUERIES.	105
<p><b>SIGNS OF EMOTION AMONGST THE CHINESE &amp;c.</b>—The following Queries have been addressed to me by a friend in England. He wishes them to be applied to the expression displayed under various emotions by the Chinese or by any other outlandish race. Some of your readers may find leisure to record their observations on this subject in <i>Notes and Queries</i>. I give my Querist's own words:—</p>		
<p style="text-align: center;"><i>Queries about Expression.</i></p>		
<p>1. Is astonishment expressed by the eyes and mouth being opened wide and by the eyebrows being raised?</p>	<p>16. As a sign to keep silent, is a gentle hiss uttered?</p>	
<p>2. Does shame excite a blush, when the colour of the skin allows it to be visible?</p>	<p>17. Is the head nodded vertically in affirmation and shaken laterally in negation?</p>	
<p>3. When a man is indignant or defiant does he frown, hold his body and head erect, square his shoulders and clench his fists?</p>	<p>Observations on natives who have had little communication with Europeans would be of course the most valuable, though those made on any natives would be of much interest to me.</p>	
<p>4. When considering deeply on any subject, or trying to understand any puzzle, does he frown, or wrinkle the skin beneath the lower eyelids?</p>	<p>General remarks on expression are of comparatively little value.</p>	
<p>5. When in low spirits, are the corners of the mouth depressed, and the inner corner or angle of the eyebrows raised by that muscle which the French call the "Grief Muscle"?</p>	<p>A definite description of the countenance under any emotion or frame of mind would possess much more value.</p>	
<p>6. When in good spirits do the eyes sparkle, with the skin round and under them a little wrinkled and with the mouth a little drawn back?</p>	<p>Memory is so deceptive on subjects like these that I hope it may not be trusted to.</p>	
<p>7. When a man sneers or snarls at another, is the corner of the upper lip over the canine teeth raised on the side facing the man whom he addresses?</p>	<p>Amoy, July, 1867. R. S.</p>	
<p>8. Can a dogged or obstinate expression be recognised, which is chiefly shown by the mouth being firmly closed, a lowering brow and slight frown?</p>	<p><b>THE TERM AH-DÍ-Á KUE-LÉ-BÁ! (阿弟 呀歸來罷.)</b> Out-of-town residents of Shanghai during these long summer evenings sometimes hear a wild wailing supplicating cry floating away on the night air. It would seem to come from some one of the many scattered Chinese hovels which line and interline the highways and other ways going to and from the Bubbling well and Zicaway roads. If the listener from his quiet country crib is interested enough to try and catch the burden of the supplication, which now and then comes strangely weirdlike towards him, he will hear a voice saying,—"<i>Ah-dí-á-kue-lé-bá!</i>" <i>Little brother, come home!</i> This is the meaning; and it is known that hereabouts the Chinese women intonate that strain for hours together, whenever they have a child, out of its mind, sick and feverish, lying low in their houses. If would appear that this out-door plead is for the spirit of the child to return to its earthly home again.</p>	
<p>9. Is contempt expressed by a slight protrusion of the lips and turning up of the nose, with a slight expiration?</p>	<p>To a Foreigner it first interests, afterwards tires, and ultimately if he cannot fall asleep with it, he gets up to moralize over it, and finally to write to <i>Notes and Queries</i> to ask if this Custom is "<i>olo</i>" and what it means?</p>	
<p>10. Is disgust shown by the lower lip being turned down, the upper lip slightly raised, with a sudden expiration something like incipient vomiting?</p>	<p>JAY TEA.</p>	
<p>11. Is extreme fear expressed in the same general manner as with Europeans?</p>	<p>Shanghai, July, 1867.</p>	
<p>12. Is laughter ever carried to such an extreme as to bring tears into the eyes?</p>	<p><b>THE WORD LASCAR.</b>—I am informed by a Parsee friend that the word "Lascar" in Persian has the signification of inferior grade or menial rank, and this agrees with the Etymology given in Webster's Dictionary. In his "<i>Indian Journal</i>" Bishop Heber mentions having been attended in Ceylon by Lascarines answering in some respects to the Peons of Calcutta; (B. 2. 149.) Is there any race among the Cingalese or the natives of Southern India, who are known by this designation?</p>	
<p>13. When a man wishes to show that he cannot prevent something being done, or cannot himself do something, does he shrug his shoulders, turn inwards his elbows, extend outwards his hands, and open the palms?</p>	<p>Canton. E. C. B.</p>	
<p>14. Do the children when sulky, pout or greatly protrude the lips?</p>		
<p>15. Can guilty, or sly, or jealous expressions be recognised?—though I know not how these can be defined.</p>		

<sup>83</sup> Called Amoy at that time, see also Table 2.1 above.

Fig. 2.7 The questionnaire disseminated by Swinhoe (Wyhe 2002)

There are seventeen questions in this query, including ‘16. As a sign to keep silent, is a gentle hiss uttered?’<sup>84</sup> Swinhoe’s announcement in the journal, however, did not arouse many valuable replies. This led to Swinhoe responding to Darwin based on his own experiences and knowledge. The first response to Darwin’s questionnaire was sent by Swinhoe on 5 Aug 1867 from Xiamen. Swinhoe’s letter to Darwin does not detail answers to the seventeen questions, but rather records some broad, common features of Chinese expression:

‘The skin on a Chinaman’s countenance is so tightly stretched that it is often difficult to detect the wrinkles, and it is the study of the mandarins and literati to affect a stolid look, often under the most trying circumstances. The lower classes will I expect give the best opportunities for experiment’ (Swinhoe 1867c).

Swinhoe mentions two things here. The first is a physical feature of the Chinese: that their skins are tighter than Europeans’ skins, so their wrinkles are not as apparent. This regards Questions 4 and 6 on the questionnaire, asking for observations on wrinkles in respect to emotions. His second contention is that there is a difference between social classes, with the higher class of ‘mandarins and literati’ tending to express a ‘stolid look’, while the lower classes have a more easily observable set of emotional expressions. Both the difference in physical features and the social differences within Chinese society were frequently repeated in Swinhoe’s subsequent letters to Darwin, which will be summarized in Section 5.

### *3.2 The second letter – formally answering the query*

Swinhoe sent Darwin his second letter on expression from Beijing one year later, on 4 August 1868. It replied to Darwin’s 26 January letter that had been received in April. Table 2.1 shows that April 1868 marked the end of Swinhoe’s consular exploration in Hainan – the second largest island in South China (see the map in Fig. 2.2), and the second letter records some findings on the native people of this area, such as that ‘the aborigines of Hainan have a very nervous expression about their faces, and appeared very easily frightened’ (Swinhoe 1868). It further confirms the racial differences that were mentioned in the previous letter. The physical features of Chinese people are likewise recalled: ‘It must not be forgotten that the Chinese face has the skin tightly

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<sup>84</sup> Wyhe (2002); Freeman and Gautrey (1972) have compared this advertised query with its other versions.



drawn over it and is not nearly so capable of expression as the skin of European faces' (Swinhoe 1868). Apart from this second stress on physical features, Swinhoe also attributes racial discrepancies in emotional expressions to cultural influences: 'it is a part of the Le or "rules of courtesy" studied by all Chinese from the highest to the lowest to hide emotions' (Swinhoe 1868). Thus, Swinhoe asserts that a 'telltale (expressive) face' that is familiar among Europeans is very rare in Chinese people, whose face can be read chiefly 'when it expresses cunning or superior knowledge' (Swinhoe 1868). Despite these limitations, Swinhoe still managed to answer Darwin's questionnaire by items:

(1) Astonishment is certainly expressed as described. The Coolie shows the emotion in common with the Literati, but both know too well how to feign it.

(2) The blush excited by shame I have noticed: but it is scarce, the Chinaman rarely allowing himself to be taken by surprise, and nearly always having an answer ready to repel your accusation. In young men I have seen it extend to the neck. They have the expression to "redden with shame". The slightest approach to intoxication reddens the face of a Chinaman, and the colour then diffuses all over his head and neck.

(3) Pretty much as described, except that, in cases where I have noted, he generally inclines forward towards the antagonist and pointing at him assails him with a volley of "dang" and then appeals to the justice of the fast-gathering crowd.

(4) Precisely the same.

(5) This I illustrate with a photograph. I think I have noticed this expression when a man was in grief and come to me for advice in his despair. But in hearing of some distressing case of death, or in telling the same to another, they often go into a hysterical fit of laughter. This in a less degree I have seen with English people, especially women, and indeed have felt myself a curious inclination to laugh on similar occasions.

(6) Just so.

(7) So.

(8) So.

(9) By considerable protrusion of the lips and turning up of the nose, but this is due in a great measure to the form of those features. The expiration I have only noticed in those that have been much with foreigners. To show a direction to go they sometimes protrude the lips and move the face forward in such direction.

(10) Very much so.

(11) I find so.

(12) Certainly.

(13) See further on.

(14) Yes!

(15) Decidedly, very strong.

(16) To induce silence the lips are generally pinched or contracted together, and the index finger of the right hand put against them. The hiss is not known. Silence is however oftenest ordered by the voice.

(17) Precisely so.

(18) His eyebrows are raised, and with right elbow to the side the man holds up his hand, the palm towards you, and shakes it from right to left.

Most of the above answers are positive responses to the query, while only two are negative. Swinhoe contradicts Darwin in two questions: (13) when a man wishes to show that he cannot prevent something being done, the Chinese do not shrug shoulders; and (16) to induce silence, the hiss is not known, while it is oftenest ordered by the voice. As we saw in Chapter 1, Question 16 was omitted from the published *Expression of Emotions*. The cause of this omission will be discussed in Part III of this chapter, after all the Asian questionnaire responses have been provided. Given the large number of texts that need to be dealt with here, these responses were generalized to produce a manageable and accessible set of data. ‘P’ is used to denote positive answers to the questionnaire questions, and ‘N’ for negative ones. Answers that provide detailed descriptions are marked with an asterisk. For example, six of Swinhoe’s answers (2, 3, 5, 9, 13, 16) provide details, while the others are just of the form ‘so’ or ‘yes’. Besides, some replies cannot be simply classified as positive or

negative because they provide more information than the query describes, with a partial confirmation or negation. They are symbolized with one of four combinations of ‘P’ and ‘N’, as listed in Table 2.2 below.

Table 2.2 A symbolization system for the questionnaire answers

P	Positive answers like ‘certainly’, ‘beautifully described’, ‘precisely the same’ and so on.
N	Negative answers.
PN	Partly positive and partly negative, positive part more than 50%.
NP	Partly positive and partly negative, negative part more than 50%.
P+	Generally positive, and with more details than Darwin describes.
P-	Generally positive, but with a weaker description than Darwin describes.
*	The above plus a *, like P*, N*, PN*, means having details.
()	If the answer is cited in the <i>Expression of Emotions</i> (1872), its page number will be given in brackets, e.g. (PN*248).

A summary of Swinhoe’s answers using this coding is provided in Table 2.3 below. The first column lists the answer types, as coded in Table 2.2 above. The second column lists the question numbers in Darwin’s 1867 query (with seventeen questions). If an answer is cited in the *Expression of Emotions* (1872), its page number is then given in brackets.

Table 2.3 Swinhoe’s answer types and Darwin’s citations of Swinhoe

Types	Number and citation page
P	1, 4, 6, 7 (p. 252), 8, 10, 11, 12, 14, 15, 17
P*	2 (p. 317)
N*	13 (p. 269), 16
PN*	3 (p. 248), 5 (p. 208), 9

Swinhoe’s third letter on expression was written on 16 October 1869, at his home in London. Table 2.1 above details that Swinhoe’s journey back to England (from July to September) was made via Japan and the American continent (Swinhoe 1869; Hall 1987: 45). During his time in Japan, he acquired a book of ‘fine photographs of Japanese which somewhat illustrate expression’, and conveyed to Darwin that he would like to send it to him (Smith 1869). Moreover, Darwin did receive some Japanese drawings, as exhibited in Fig. 2.8 below. However, the *Expression of Emotions* provides no information on Japanese people’s expressions, and no photographs illustrating the expressions of people of other races. Though Darwin’s

query requires as many details as possible, what is extracted from the answers is still a simple confirmation or negation. This fact will be established in the following section by reading through the texts in relation to Swinhoe's cited answers.

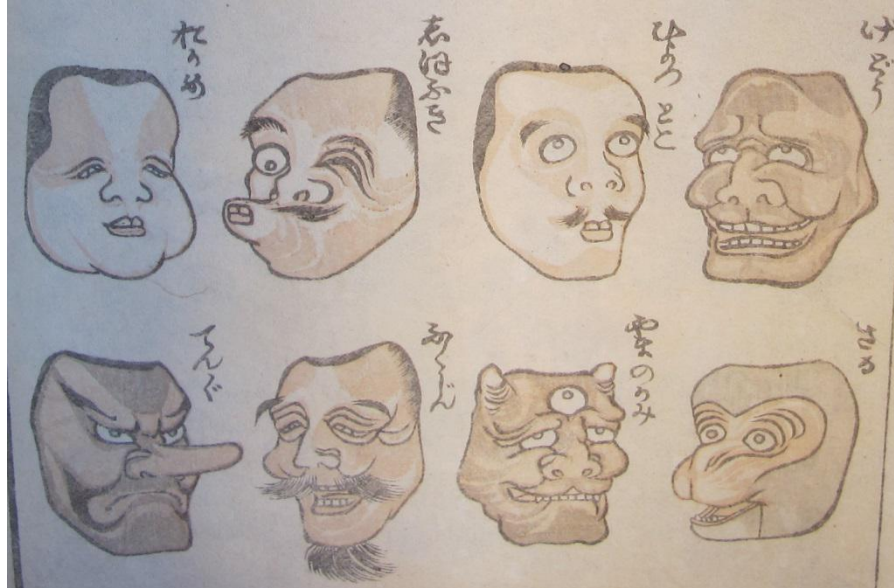


Fig. 2.8 Hokusai Manga<sup>85</sup> sent to Darwin in 1876 (CUL<sup>86</sup>, FJ.963.1-7)

#### 4 Darwin's use of Swinhoe's answers and Swinhoe's comment

##### The characteristics of Darwin's citation

Table 2.3 above shows the five answers from Swinhoe that are cited by Darwin. They are answers to Questions 2 (cited on p. 317), 3 (p. 248), 5 (p. 208), 7 (p. 252) and 13 (p. 269). Among these five answers, four of them are positive, with the one exception being the answer to number 13. Four of these answers also provide detailed descriptions, with the exception being no. 7. As Table 2.3 shows, Darwin does not mention ten of the eleven simple answers that provide simply a 'yes' or 'just so' response at all. From the use of Swinhoe's answers in the *Expression of Emotions*, we can thus grasp how Darwin dealt with the questionnaire data.

First, if a question receives enough positive answers, Darwin intends to show his cautiousness, with preference being given to the more detailed responses. Swinhoe's answer to Question 2 regarding blushing is cited in this way: 'Mr. Swinhoe has seen the Chinese blushing, but he thinks it is rare; yet they have the expression "to redden

<sup>85</sup> Hokusai Manga is a collection of Japanese drawings, including two pages of human and animal faces. Hokusai is the name of the painter.

<sup>86</sup> Cambridge University Library.

with shame” (p. 317). Swinhoe’s second letter reports a young man’s blush to the neck, and concludes that Chinese people have the expression to ‘redden with shame’. However, this young man’s case is not reflected in the book, because more convincing results are available from other informants. Immediately after citing Swinhoe’s remarks on blushing, two examples of Chinese Malays are cited from F. Geach<sup>87</sup>:

‘Omitting the cases in which the face alone was seen to blush, Mr. Geach observed that the face, arms, and breast of a Chinaman, aged 24 years, reddened from shame; and with another Chinese, when asked why he had not done his work in better style, the whole body was similarly affected’ (p. 317).

The first half of the quotation can explain why Swinhoe’s case is not used: the young man in Swinhoe’s report only reddens to the neck, whereas those in Geach’s observations blush to the breast and to the whole body respectively. Thus, Darwin selects the subjects who exhibit the most pronounced blush reaction. Given this array of positive observations, Darwin is confident in affirming that ‘blushing... is common to most, probably to all, of the races of man’ (p. 321).

Second, if a question’s negative answers show similarities, they are generalized as showing a pattern. For example, in relation to Question 13 on shrugs, there are far more negative answers than positive ones. For example, Mrs. Barber had never seen this gesture among the Kafirs in South Africa, nor did Gaika and other four informants (p. 269).<sup>88</sup> Though shrugs were not observed among the Chinese, Swinhoe’s answer is still cited here, because it contains the only detailed description: ‘Mr. Swinhoe is also doubtful about the Chinese; but he has seen them, under the circumstances which would make us shrug our shoulders, press their right elbow against their side, raise their eyebrows, lift up their hand with the palm directed towards the person addressed, and shake it from right to left’ (p. 269). Darwin then argues that the movements of elbow, raising eyebrows and turning palms are ‘proper’ movements accompanied in shrugging the shoulders. Thus, eyebrow-raising by Chinese people is classified as having the same pattern as shrugging among Europeans. This enables Darwin to claim that the shrug is ‘a gesture natural to mankind’ (p. 269).

Third, if the detail of an answer deviates too much from the expression asked about in the question, Darwin has to make some concession, which is most often seen in the PN\* ones. With Question 3 on indignation, ‘Mr. Swinhoe says that my description

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<sup>87</sup> Mr. F. F. Geach, a mining engineer in the interior of Malacca, was introduced to Darwin by Wallace. Geach wrote Darwin two long letters with detailed observations on native expressions, including those on Chinese immigrants in the Malay Archipelago (Darwin 1872: 21).

<sup>88</sup> See the Appendix.

agrees with what he has seen of the Chinese, excepting that an angry man generally inclines his body towards his antagonist, and pointing at him, pours forth a volley of abuse' (p. 248). Here, Swinhoe's answer is taken as being roughly affirmative because of the diversity in other informants' observations. For example, Mr. Bridges observed that 'the Fuegians, when enraged, frequently stamp on the ground, walk distractedly about, sometimes cry and grow pale' (p. 248), which is obviously different to the details provided by Swinhoe's answer to the query. This time, Darwin has to concede by saying that 'there is an exception with respect to clenching the fists, which seems confined chiefly to the men who fight with their fists' (p. 247). Swinhoe's report is raised here as a supportive case, while in other cases, partially negative answers were not reproduced or even mentioned at all.

Fourth, when he encounters a special answer that is not consistent with his expectations, Darwin tries to link it with other confirmed expressions. In respect to Question 5 on grief, 'Mr. Swinhoe informs me that he has often seen the Chinese, when suffering from deep grief, burst out into hysterical fits of laughter' (p. 208). Swinhoe's observation on the Chinese who burst into laughter is postulated as being a unique expression of deep grief. This transition between extremely different emotions is attributed by Darwin to 'the close similarity of the spasmodic movements caused by these widely different emotions that hysteric patients alternately cry and laugh with violence, and that young children sometimes pass suddenly from the one to the other state' (p. 208). Darwin makes a clever move in comparing Swinhoe's observations on Question 5 with the expressions described in Question 12 – shedding tears after excessive laughter – on which he has amassed a lot of certain answers from his informants, including from Swinhoe.<sup>89</sup> Since they are antithesis expressions in antithesis emotions, this allows Darwin to theoretically rationalize the unique case reported by Swinhoe for Question 5.

Last, but not least, when there is lack of detailed positives answers, Darwin is then forced to cite from the simpler ones, and turns to additional sources to verify them, e.g. to experiments. With respect to Question 7 – on sneering – Swinhoe only wrote a 'so' to endorse Darwin's description in the query, thus providing no supporting detail. Since 'the expression is rare, and as they enter into no details', Swinhoe's simple affirmation has to be cited here. The cause of its rarity cited by his informants is that, 'the face is commonly half averted, and the expression is often momentary' (p. 252). In order to check the physical mechanism of sneering, Darwin 'asked four persons to endeavour to act voluntarily in this manner'. The result turned out to be that 'two could expose the canine only on the left side, one only on the right side, and the fourth

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<sup>89</sup> But Swinhoe's undetailed answer to Question 12 – 'certainly' – is not cited there.

on neither side' (p. 252). Despite these efforts, Darwin at last admits that, 'It is, however, by no means improbable that this animal-like expression may be more common with savages than with civilized races' (p. 252).

From the above we can see that, with the exception of Question 7, only detailed answers were used by Darwin, and Darwin takes all the cited answers to be supportive of his hypothesis on racial universality, although to more or less of an extent. Even with respect to Question 13 on shrugging – something that Swinhoe and most other observers provided evidence against the universality of – Darwin provides a farfetched conclusion in an attempt to rescue its universality. This move was criticized by Swinhoe in his last letter to Darwin on expression, dated 26 March 1873. After receiving a copy of the *Expression of Emotions*, Swinhoe replied:

'I am very thankful to you for the copy of your last book. I note that you hesitate in accepting my statement about the Chinese not shrugging their shoulders. I find it nevertheless to be a fact. I have never seen a Chinese do so, and I cannot find anyone that has. Chinese displays helplessness by opening out his hands, but he keeps his elbows *away from his sides*. In doing this, it is not easy to shrug the shoulders' (Swinhoe 1873).

Swinhoe's comment would not have shaken Darwin's mind, however. With all the received answers, no matter how many details are provided and how much they differ from the query, Darwin still insists that his thesis about the universality of expression among human races is correct. He always endeavours to claim that the expression, whatever it is, 'is natural to mankind'. Nevertheless, beyond the unified conclusion on uniformity, the large number of negative results should not be overlooked. By summarizing and classifying the information, we can grasp what findings on expression were disclosed by Darwin, and whether this represented a calculated decision to prevent his theory from being undermined or not. This job starts with considering Darwin's response to Swinhoe's answers in more detail.

## **5 A classification of Darwin's neglect of Swinhoe's findings**

Apart from the five answers selectively chosen by Darwin, there are some findings that are either irrelevant or contradictory to Darwin's hypothesis of racial universality. These results are summarized in Table 2.4 below. The first column lists types of information, whilst the second column shows Swinhoe's observations. Let us take the first type of neglect – similarity of expression – as an example. Question 9 asks: 'Is contempt expressed by a slight protrusion of the lips...?', and Swinhoe reports that 'to

show a direction to go they sometimes protrude the lips'. The second type of neglect is the overlap between emotions – i.e. that some emotions happen spontaneously. The other types of neglect relate to sounds and the communicative function of expression, the conversion of one emotion into another and the progression of civilization. These were all largely ignored by Darwin in the *Expression of Emotions*. If these findings were frequently mentioned by other informants, then Darwin's neglect of them could certainly not be attributed to an unintentional lapse or omission. Section 7 below will look more generally at the Asian answers and provide a fuller classification of those findings. To preface the broader picture, the types of findings in Swinhoe's answers are followed by the subtitles of Section 7, as numbered in the first column.

Table 2.4 A classification of Darwin's neglected information on expression

Types of neglect	Swinhoe's answers
Similarity 7.1.2	9. '...To show a direction to go they sometimes protrude the lips and move the face forward in such direction.'
Overlap 7.1.3	'The blush excited by shame I have noticed...the Chinaman rarely allowing himself to be taken by surprise, and nearly always having an answer ready to repel your accusation.'
Sound 7.3	3. '...Assails him with a volley of 'dang' and then appeals to the justice of the fast-gathering crowd.' 16. 'Silence is however oftenest ordered by the voice.'
Conversion 7.4	5. 'But in hearing of some distressing case of death, or in telling the same to another, they often go into a hysterical fit of laughter. This in a less degree I have seen with English people, especially women, and indeed have felt myself a curious inclination to laugh on similar occasions.'
Progress in civilization 7.5	'The aborigines of Hainan have a very nervous expression about their faces, and appeared very easily frightened.'
The communicative function 7	5. 'I think I have noticed this expression when a man was in grief and come to me for advice in his despair.' 13. '...the palm towards you, and shakes it from right to left.'

### What's special in China?

The above phenomena are part of Darwin's wider neglect in all the Asian answers,



which will be discussed in Part III. For now, it should be noted that there are a number of peculiarities regarding Chinese expressions that Swinhoe recorded and conveyed to Darwin. Firstly, he stressed twice – in his first two letters – that the facial skin of Chinese people is much tighter than that of Europeans, which he said made their wrinkles less apparent. Secondly, the social status in China is taken into account in relating differences in expression between the ‘Coolie’ and ‘Literati’ classes. Third, the cultural and educational influences on expression are discussed – the idea that Chinese people tend to hide their emotions and express a ‘stolid look’ – something imparted through the teaching of Confucian Ritual. In Chinese tradition, every educated person had to study Confucianism, under which a freely expressed emotion can be regarded as being impertinent and innocent. Within such an educational system, age was thus an important factor in relation to the range and type of emotional expressions – as people grew up, they steadily learned to control their emotions as a result of this cultural norm. The above four features of Swinhoe’s thoughts on emotional expression in China are summarized in Table 2.5 below. The first column lists the types of information that Swinhoe provided details on – that is, physical features, social status, cultural influence and age difference. The second column provides Swinhoe’s reports corresponding to the four items.

Table 2.5 Swinhoe’s findings on the peculiarities of Chinese expression

Types of peculiarity	Swinhoe’s findings
Physical features	<p>‘The skin on a Chinaman's countenance is so tightly stretched that it is often difficult to detect the wrinkles.’</p> <p>‘...the Chinese face has the skin tightly drawn over it and is not nearly so capable of expression as the skin of European faces.’</p> <p>9. ‘...but this is due in a great measure to the form of those features.’</p>
Social status	<p>‘The lower classes will I expect give the best opportunities for experiment.’</p> <p>1. ‘The Coolie shows the emotion in common with the Literati.’</p>
Cultural influence	<p>‘...it is the study of the mandarins &amp; literati to affect a stolid look, often under the most trying circumstances.’</p> <p>‘...it is a part of the Le or ‘rules of courtesy’ studied by all Chinese from the highest to the lowest to hide emotions.’</p> <p>‘You can often read the face, chiefly however when it expresses cunning or superior knowledge.’</p> <p>1. ‘The Coolie shows the emotion in common with the Literati, but both know too well how to feign it.’</p>

	‘...rarely allowing himself to be taken by surprise.’
Age difference	2. ‘In young men I have seen it [blushing] extend to the neck.’

In addition, Swinhoe compared the aborigines of Hainan – Li people – with residents of mainland China. The former exhibit a more nervous expression and easily get frightened (Swinhoe 1869). Li people live southernmost among China’s fifty-six peoples, and their history can be traced to Neolithic Era, although they had no writing system until 1948 (Baiké 2013). Swinhoe’s records in Hainan<sup>90</sup> help to shed light on Li people’s culture and customs. However, such considerations, together with those listed in Table 2.5 above, will obviously increase the racial and social diversity of expression and challenge its uniformity, and thus they were ignored by Darwin.

### **Part III: Darwin’s selective handling of the Asian data as part of a larger pattern of publication bias**

This part of the chapter extends the comparison between the answers to the questionnaire and Darwin’s citations from the Chinese cases to the whole set of samples from Asia. It comprises two sections. Section 6 categorizes and quantifies the answer types, as Section 3 does, to explain why Question 16 is deleted from the published query. Section 7 extracts negative results from the Asian answers, as uses Swinhoe’s report in Section 5 to draw a fuller picture of Darwin’s publication bias.

## **6 A quantitative analysis of Asian replies to Darwin’s query**

### *6.1 A summary of the answer types*

By way of generalizing somewhat from the Chinese case analysed above, but without extending the study to an unmanageably large scale, I will now analyse all the letters from Asia using the same coding system as that provided in Table 2.2, with P standing for positive answers, N for negative answers, and so on. The data are given in full in three tables listed in Appendix A. Table A1 contains the answers from China, Malaysia and Philippines, and Table A2 codes the letters from India and Sri Lanka. The answers from Australia and New Zealand are coded in Table A3.<sup>91</sup> The names of the informants are provided in the first rows of the three tables.<sup>92</sup> Except for the diplomat in China, Swinhoe, and an engineer – F. F. Geach – in Malaysia, most of the other informants

<sup>90</sup> He published an article entitled ‘The aborigines of Hainan, and narrative of an exploring visit to Hainan’, which was mainly concerned with native languages (Swinhoe 1872).

<sup>91</sup> Some informants provided more details than the query asked for. The useful parts, though unsolicited, will still be quoted in the Appendix.

<sup>92</sup> Some are given with their locations and the dates of the letters.

were missionaries.

The information in Appendix A is summarized in Table 2.6 below, with an outline of each answer type. The row numbers represent the questions from Darwin's 1867 query. The first three columns present the results from the three tables/regions (Table A1–A3). The fourth column summates the total number of answers that were positive (P), negative (N), and so on. The last column deducts the number of negative answers from the number of positive ones to produce a numerical value. The value indicates the 'strength' of positive replies to each question. The higher the value is, the more positive and the less negative that answers it receives were.

Table 2.6 A summation of the answer types from Asia and the positive strength of these answers

	China, Malaysia and the Philippines	India and Sri Lanka	Australia and New Zealand	P=P+P*+(P), and so on	(P+PN)-(N+NP)
1	P, N*, (PN*)	(P*), P	(P*),P,N*,(PN*), (PN*)	5P,3PN,2N	6
2	(P*), (P*), (N*)	(N*), (P*)	(PN*), (N*), (N*), (P*)	4P,1PN,4N	1
3	(PN*), PN*, N*	(P*), (N*)	PN*,PN,N*,PN*,(PN*)	1P,6PN,3N	4
4	P, PN*, P-*	N*,(N*)	(P*), P, N*	4P,1PN,3N	2
5	(PN*), (PN*), N	NP*, (P)	N*, (PN*), N*	1P,3PN,1NP,3N	0
6	P, P*, (PN*)	P*,P	(PN*),P,N*,(PN*), (PN*)	5P,4PN,1N	8
7	(P), (P), N	P+*,N,(P)	(PN*), (PN*)	4P,2PN,2N	4
8	P, P, P*	(P*),P	(P*),P,P	8P	8
9	PN*, (NP*)	P*,NP	(PN*),P,P	3P,2PN,2NP	3
10	P, (P*), (NP*)	(P+*),NP	PN,P	4P,1PN,2NP	3
11	P, P, P*	P+,P,P	(P*), (P*), (P*)	9P	9
12	P, P, (P*)	P*,P	(P*),P,(P*)	8P	8
13	(N*), (PN*), (N*)	(P+*), (PN*)	N,N*,N*,N*,	1P,2PN,6N	-3
14	P, P, (PN*)	(P+*),P	(P*),P,P,(P)	8P,1PN	9
15	P, N, P	P+*,PN,PN	(PN*), (PN*),N	3P,4PN,2N	5
16	N*, P, N*	NP	P,PN*,PN*	2P,2PN,1NP,2N	1
17	P, (N*), P, (N*)	(N*), (N),P	(PN*),P,(PN*)	4P,2PN,4N	2

## 6.2 Characteristics of the data on expression from Asia

### A. Citations preferentially pick out detailed and positive responses

From the first three columns it can be seen that the answer type that appears most often is ‘P’, indicating that most answers simply confirm the query but without providing observational details, such as ‘yes’, ‘so’, ‘certainly’, ‘precisely’, ‘beautifully described’, and so on. Darwin underlined the clarification at the end of each questionnaire that was sent out saying that general remarks would be of little value. His citations are consistent with this criterion, with most answers that he cites (in ()) providing details (marked with \*). However, Darwin did sometimes have to mention simple answers when there were shortages in positive detailed remarks. With respect to Question 7 – on the sneer or snarl – there are three simple answers (P) introduced in the *Expression of Emotions*: two from Region 1 (of Table A1), and the other from Region 2 (of Table A2).

### B. Distinctions between basic and advanced emotions

If we sort the value in the last column from largest to smallest, the sequence runs Question 11: fear, 14: children’s sulkiness, 12: laughter, 8: dogged or obstinate, 6: good spirits, 1: astonishment, 15: guilt, slyness or jealousy, 3: indignant or defiant, 7: sneers or snarls, 10: disgust, 9: contempt, 17: affirmation and negation, 4: considering, 2: shame, 16: As a sign to keep silent, 5: low spirits, and 13: cannot prevent something being done, or cannot himself do something. Among these, Questions (8) and (15) ask different questions from the others, featuring just a simple sentence that queries ‘could the expression be recognized?’ rather than asking for details. If we remove these two from the above list, the first five in the new sequence will be Question 11: fear, 14: sulkiness (anger), 12: laughter, 6: good spirits and 1: astonishment. The number value in the last column stands for the positive strength of the answers for each emotion. Interestingly, the five emotions that receive the most satisfactory results for Darwin in his questionnaire all fall into Ekman’s (1972) category of the six basic emotions, namely: anger (Darwin’s Question 14), disgust and fear (Question 11), happiness (Questions 12 and 6), and sadness and surprise (Question 1). The other instance of ‘disgust’ (Question 10) is not far off, at eighth place, and the other instance of ‘sadness’ (Question 5 on grief) is probably lower because of the complex narration of the question, requiring an elaborate observation on muscle level, ‘which the French call the "Grief muscle"’ (Darwin 1867). As the longest question on the survey, its second half reads like this: ‘The eyebrow in this state becomes slightly oblique, with a little swelling at the inner end; and the forehead is transversely wrinkled in the middle part, but not across the whole breadth, as when the eyebrows are raised in surprise’ (Darwin 1867). If the informant managed to understand the statement adequately, and then did not agree with any part of this lengthy description, the answer could not be counted as

positive.

### C. Emotions with extremely negative results

Questions 8 and 15 are simply worded because Darwin could not easily provide detailed descriptions of the four emotions involved: obstinacy, guilt, slyness and jealousy. These are more advanced and complex than basic emotions like laughter and disgust. In relation to these advanced emotions, if a keen observer of expression like Darwin has failed to describe them, then it may be too much to expect amateur informants such as engineers, missionaries and diplomats in Asia to make explicit remarks about them. The above results and analysis show that, in general, basic emotions are more observable and describable, and this is why they are of higher value in the final column. Contrariwise, some questions about more advanced emotions receive no positive answers. For example, Question 15 asks, ‘Can guilty, or sly, or jealous expressions be recognized? though I know not how these can be defined’ (Darwin 1867). This question concerns three emotions – guilt, slyness and jealousy – and in all the Asian answers, the types ‘P’ and ‘PN’ are mostly attributed to guilt and sometimes to slyness, whilst none of the informants gives any report concerning jealousy. Another unusual (non-emotional) expression is asked about in Question 17: ‘Is the head nodded vertically in affirmation, and shaken laterally in negation?’ (Darwin 1867). Its positive answers chiefly refer to nods for affirmation, but the people of most of the nations report that they do not shake their heads to show negation. Technically speaking, if a question’s (P+PN)-(N+NP) result is below 3, its answers are not trustworthy, because there are many ‘Ps’ without any detail while most negative answers have detailed explanations attached to them.

### *6.3 Darwin’s strategies for dealing with advanced and unusual emotions*

#### a. Complete deletion

The above analysis shows that some of the emotions on Darwin’s query are not universally recognized by his informants. These consist of the advanced (non-basic) emotions and unusual (non-emotional) expressions, such as affirmation and negation. How are these unwanted results disposed of by Darwin in the *Expression of Emotions*? Firstly, as already noted, Darwin deletes Question 16 from the query and avoids mentioning slyness through the course of the whole book. The positive strength of Question 16 was only 1, and slyness has a negative score because most answers to it were negative. However, this was not the only reason why they were discarded – another primary reason will be provided in Section 7.

### b. Organizing chapter order

Secondly, among the emotions that ‘survive’ the cut, those that receive just a few positive detailed answers do not appear in chapter titles, such as ‘dogged’ or ‘obstinate’ in Question 8, ‘jealousy’ in Question 15, and ‘shrug’ in Question 13. Discussions of all of these emotions are relegated to an inconspicuous part of Chapter XI. In fact, even nowadays, not all the emotions introduced in Chapter XI are regarded as universally recognizable. The chapter orders of the *Expression of Emotions* may reveal Darwin’s diffidence that he sandwiches the discussion of all the non-uniform and controversial emotional responses in Chapter XI – between Chapters X, XII and XIII, in which chapters the emotions are quite affirmative to Darwin’s account of universality. This helps him to hide the lack evidence in chapter XI. In other words, the book seems to be organized to end with more confirmative chapters, rather than with the mostly disappointing results seen in chapter XI. However, it might be a little early to decisively draw this conclusion before the evidence and findings below have been considered.

### c. Selective citations

When talking about the basic emotions, which he is confident with, Darwin often cites the ‘PN\*’ answers to show how he has fairly presented all the details concerning the expression – both positive and negative. However, he only cites the ‘N\*’ results when he is very confident regarding the universality of an expression, such as with shame. In other word, the N\* and NP\* answers are much less frequently cited than the positive ones, even if they are full of details and the objects are free from European influence. Section 4 provided Swinhoe’s testimony in discussing Darwin’s lack of citations to Swinhoe’s answers. In general, detailed negative answers are seldom cited, and are only given when he is already very confident about the universality of a particular expression.

### d. Resorting to an emotion’s origination

In all Darwin’s citation of these letters, no matter how low the positive strength of the response is, he always reaches the affirmative conclusion that the relevant expression is universal among global races. A representative case is Question 17, on affirmation and negation, which is discussed at the end of Chapter XI. There are plenty of entirely negative responses regarding negation. For instance, Darwin notes that ‘Mr. Dyson Lacy had never seen this latter sign in Queensland’, and many observers report that

negation is expressed by throwing the head a little backwards whilst protruding the tongue or making a clucking noise with the tongue (Darwin 1872: 275). This phenomenon is observed by Mr. Bulmer in Gippsland, Australia, and by Mr. H. Erskine in India with Hindus. Even Darwin himself admits that modern Greeks and Turks express negation in this way (p. 275). Despite other negative reports on shaking the head, by just considering the second Principle of Antithesis, Darwin could have changed the description in Question 17. In contrast to shaking the head, throwing the head backwards is a more direct antithesis expression to nodding the head. Darwin should have at least listed the two expressions – shaking the head and throwing it backwards – equally in his question. However, his actual way of dealing with this problem casts doubt on the credibility of the book. He writes:

‘if we admit that the shaking of the finger or hand from side to side is symbolic of the lateral movement of the head; and if we admit that the sudden backward movement of the head represents one of the actions often practised by young children in refusing food, then there is much uniformity throughout the world in the signs of negation, and we can see how they originated’ (p. 277).

Here, Darwin sharply ends the discussion on the phenomenon with a speculative leap to its origination, which is out of the scope of his knowledge and his testing methods, and thus could never be tested in this book. Such smoke and daggers tactics are utilized many times.

#### e. Applying anecdotal evidence

Last but not the least, if the emotion has no positive answer at all, Darwin refers to novels and lower animals which, as sources, are either untrustworthy or unverifiable. ‘Jealousy’ provides a case in point. Darwin writes that, ‘Shakespeare.....speaks of Jealousy as "the green-eyed monster;"...., My correspondents ... they generally deny that jealousy can thus be recognized. ... Even insects express anger, terror, jealousy, and love...’ (p. 350). The above represents the entirety of his discussion of jealousy. Although he does not draw an irrational conclusion on the uniformity of the expression of jealousy here, there is no clear line drawn between the basic and the universal emotions and between the advanced and learned ones throughout the course of the book. Even with the former ones, Darwin often draws hasty conclusions. Chapter 1, in discussing the methodology, explains that the latter half of the *Expression of Emotions* will concern Darwin’s second hypothesis – the universality of expression among global races. But when we read through the text in depth, in some cases it also contributes to the first hypothesis – the uniformity of human and animal

expressions. For example, in relation to Question 7 on sneers and snarls, Darwin argues:

‘The expression here considered, whether that of a playful sneer or ferocious snarl, is one of the most curious which occurs in man. It reveals his animal descent. ... We may further suspect, notwithstanding that we have no support from analogy, that our semi-human progenitors uncovered their canine teeth when prepared for battle, as we still do when feeling ferocious, or when merely sneering at or defying some one, without any intention of making a real attack with our teeth’ (p. 253).

In the above discussion of sneering and snarling, Darwin associates them with his earlier findings on the evolution of teeth. In the *Descent of Man* he observes:

‘We may readily believe from our affinity to the anthropomorphous apes that our male semi-human progenitors possessed great canine teeth, and men are now occasionally born having them of unusually large size, with interspaces in the opposite jaw for their reception’ (p. 253; Darwin 1871:126).

Thus, a consistent pursuit of uniformity characterizes his different large works, from the *Origin of Species* through to the *Expression of Emotions*. But does this pursuit of uniformity between man and animals and among global races affect Darwin’s fairness in dealing with results that run contrary to his hypotheses?

This section has shown how Darwin dealt with the Asian data, from the general to the particular, and has thus provided an extension of Section 4, which was concerned with reports from China. The neglected information contained in Swinhoe’s letters was summarized in Section 5 above, and it led to us question whether Darwin had intentionally hidden information or only unintentionally neglected it. By investigating all the messages from Asia, the following section will now finally answer this question.

## **7 Reflections on the negative results: some overlooked findings on expression**

The hypothesis here is simple: the more times an unused or uncited finding was repeated by different observers, the more likely that it was intentionally ignored by Darwin. The findings that were provided in the letters are listed below, from the most to the least often addressed issues. Corresponding evidence is extracted from the Asian letters and put into table form within each subsection, together with the names and locations of the relevant informants. The letters are cited from the Darwin



Correspondence project edited by Frederick Burkhardt.

## 7.1 *The subdivisions, similarities and overlaps in emotional expression*

### 7.1.1 *Subdivisions of emotions*

Darwin's informants recorded diverse causes and conditions for some emotions. Some of the examples are provided in Table 2.7 below. The first column details the emotions and their question numbers in the 1867 query. The second column lists the different causes cited for them by the informants from around the world.

Table 2.7 Subdivision of emotions

Emotion listed in the query	Different causes and intensities of the emotion
2. shame	(1) Shame when caught doing something forbidden. John Scott in India observes labourers' expressions of shame when caught smoking. (2) Shame when being criticized (Geach, Johor of Malaysia). (3) Shame when talking about sex (Lacy, Queensland of Australia). (4) Shame after being laughed at. 'The idea of this poor old clumsy ragged fellow driving in his private carriage was so absurd, that I burst out laughing; the old man blushed to the roots of his hair' (Stack, New Zealand).
3. indignant or defiant	(1) 'In anger the mouth if firmly closed nostrils distended and the man picks up the first thing at reach to hurl at the person against; (2) in deliberate anger, more like we do. They are incapable of mental exertion' (Bulmer, Melbourne, Australia). These examples show how the expression of anger varies in degrees.
4. considering	Mr West provides two conditions relating to 'considering': (1) 'In trying to comprehend the brows are wrinkled and the mouth closed but not tightly closed.' (2) 'In meditation or the endeavour to recollect the brows are uncontracted, the lips half open the head often a little towards one side.' (West, Mumbai of India). (3) When trying to remember a word he has forgotten (Smyth, Melbourne of Australia).
5. low spirits	In John Scott's two letters to Darwin, he mentions three types of grief: (1) grief in the first letter is caused by losing one's fortune, which is NP* and not cited.

	<p>(2) The second type of grief happens when the subject has to sell his favourite goat, which is (P*) and is cited.</p> <p>(3) The last type is a young Dhangar woman's sorrow when she realises that she is going to lose her child. Scott observes her expression both when she is alone and appealing to him for help, which varies in these cases. This is (PN*) and is cited, but the accompanying verbal communication is not mentioned by Darwin (Scott, Kolkata of India).</p>
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As Table 2.7 illustrates, many of the emotions that the query asks about can be subdivided based on their different causes (conditions) and levels of intensity. The examples noted above are only parts of whole cases. Although subdividing emotion might be an endless endeavour, given the large number of similar reports, it is nonetheless strange that none of these different sorts are distinguished in the *Expression of Emotions*. For example, there are four kinds of shame listed in the table, all of which are raised through communication. Darwin's dismissal of these subdivisions and the communicative function of emotion points to the same goal – to avoid admitting instances of dissimilarities in emotional expressions amongst races. Sections 4 and 6, in discussing the cited answers to the query, reveal that Darwin's conclusions about them are always the same – that they confirm universality. Given his ideology, anything in the results that makes the distinctions between expressions more pronounced is simply abandoned in publishing.

### 7.1.2 Similarities between emotional expressions

Sometimes two or more emotions can have the same expression. The testimonies have been extracted from the Asian letters and are provided in Table 2.8 below. The first column presents the relevant emotions in the order they were numbered in Darwin's 1867 query. The second column contains observations made by the query informants. The third column marks the names of similar emotions.

Table 2.8 Similarities between expressions of emotions

Emotions	Observations	Similarities
1. astonishment	'this beating of Chest, sometimes when pleased' (Brooke, Sarawak).	Astonishment and pleased
5. low spirits	'very much like a person about to cry at some great loss' (Geach, Johor of Malaysia).	Low spirits and crying
7. sneers or snarls	'Look of sternness (sneering or snarling is not often resorted to)' (Brooke, Sarawak).	Sneers and sternness

8.dogged or obstinate	'Fixity or rigidity of countenance and look of sternness' (Brooke, Sarawak).	Dogged and sternness
9.contempt	'Contempt is shown by a slight smile and in silence' (Brooke, Sarawak).	Contempt and smile
10. disgust	'As described or shrug shoulders' (Lacy, Queensland of Australia).	Disgust and shrug
13. cannot prevent something being done, or cannot himself do something.	'He merely admits so and turns away as if half ashamed' (Bulmer, Melbourne of Australia).	Cannot prevent something being done and ashamed
14.children are sulky	(1) 'To show a direction to go they sometimes protrude the lips and move the face forward in such direction' (Swinhoe, China). (2) 'Put their fists in their mouths and stare as if in rage before generally crying' (Brooke, Sarawak).	Children are sulky and to show a direction; Are sulky, show rage and are crying.

Questions 4, 5 and 6 from Darwin's query all concern movements around the eyes, such as the winking of eyes and frowning. It is very possible for observers to find such expressions alike. This is the same for Questions 7 to 10 on contempt, sneering, doggedness and disgust – all these passive emotions involve movements around the mouth. Thus, there are two groups of emotion on the questionnaire that are linked to the eyes and the mouth respectively. However, the emotions in the same group are discussed separately in the book, without many links being drawn between them. Since their relation to the same facial areas is not highlighted by the author, it is quite difficult for readers to grasp this fact from the dispersed passages.

Moreover, in addition to not stressing this link, Darwin's discussion of the expression is indeed independent from its cause – the emotion. As mentioned in my foregoing chapter, Chapter VI of the *Expression of Emotions* through to its end deals with the expression of human emotions and inquires into racial universality. All these chapter titles are named after emotive terms, such as Chapter VII – Low Spirits, Anxiety, Grief, Dejection, Despair. The content of these chapters never challenges the legitimacy or precision of these terms for defining the relevant expressions, but simply describes them straight away. That is, the connotations of these emotive terms are never seriously considered, but are simply used to tag the expressive behaviours that Darwin has collected. Taking the above problem and the subdivision of emotion together, we

can understand why the author has to jump directly from the title's emotive terms to their manifestations in the content – it is because both these problems will increase the variety of emotions and weaken the argument for the universality of their expression.

### 7.1.3 *The overlap of emotions*

Some emotions often accompany one another, and their expressions overlap as a result – an observation made by some of the informants in Asia. The evidence for this is drawn from their reports and is provided in Table 2.9 below. The first two columns function the same as those in Table 2.8 above, with the third column listing the names of the overlapping emotions.

Table 2.9 Simultaneously acting emotions

Emotions	Observations	Overlapping emotions
2. shame	(1) Shame bound with astonishment (Scott, India). (2) Blush after being criticized, may be shame, maybe rage (Geach, Johor of Malaysia).	Shame and astonishment; shame and rage.
6. good spirits	(1) Smyth, in Australia, observes curiosity and good spirits in two black people, and curiosity appeared frequently, mainly relating to their good spirits, like smiles, and sometimes with astonishment. (2) 'I showed him a mass of silver in a glass case – beautifully mounted, and bearing a slight resemblance to a sheep, a thing surprising and singularly attractive to a Black fellow ... His curiosity was excited. The upper lip was slightly drawn together, and slightly protruded, and all the muscles about the corner of the nose worked rapidly' (Smyth, Melbourne of Australia).	Curiosity and good spirits and astonishment; surprising, curiosity and good spirits.
7. sneer	Scott observes a sneer in a quarrel, combined with anger and contempt, even with astonishment (Scott, Kolkata of India).	Sneer, anger, contempt and astonishment.
10. disgust	Mr. West says that disgust never appears alone, 'it has always been accompanied by fear or a desire to suppress any sign of emotion' (West, India).	Disgust, fear and suppression
11. fear	'He was angry and much frightened – and almost a death like pallor was exhibited' (Smyth,	Fear and anger.

	Melbourne of Australia).	
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The observations in the above three tables all add to the complexity of emotions, and reaffirm the fact that Darwin avoids mentioning the link between emotion and expression, and that the *Expression of Emotions* focuses on the manifestation of emotion rather than the causes and conditions of emotional responses. Thus, the above results are not reflected in the book for the sake of simplicity and clarity. In spite of the above messages on the variety of emotional types, there are some other reports on expression that are fundamentally contradictory to the second hypothesis on racial universality. The following sections will introduce several types of such negative data made by individuals regarding the cultural aspects of emotional expressions.

### 7.2 Individual differences in relation to gender, societal and racial factors

Swinhoe observed gender and social differences in Chinese expressions, as noted in Section 5 above. His report was not unique in this way among the Asian letters. Table 2.10 below summarizes the findings from other informants. The first two columns contain the same kinds of information as Table 2.9, whilst the third column summarizes the impact factors in these reports.

Table 2.10 Factors impacting on individual differences

Emotions	Observations	IF (Impact Factors)
1. astonishment	(1) 'with astonishment, this beating of [the] Chest is particularly done by women' (Brooke, Sarawak). (2) 'the action is more observable in some individuals than in others (Stack, New Zealand).	Gender, individual differences
2. shame	'No shame in the adult Aborigines, but the children when ashamed their eyes present a restless watery appearance as if they did not know where to look' (Bulmer, Melbourne of Australia).	Age
3. indignant or defiant	Scott mentioned the expression was special for the lower classes in India – [the] Mochi caste (Scott, Kolkata of India).	Social status
10. disgust	'Disgust is expressed (particularly by Malays) by spitting out the word 'Poeh' or Po-he. Dyaks often utter a guttural sound and say 'Baka Jelu' (like a beast)' (Brooke, Sarawak).	Race
12. laughter	'Women put their hands before their mouths to hide them, when laughing' (Brooke, Sarawak).	Gender

13. cannot prevent something being done, or cannot himself do something	‘...opens his legs’ (Geach, Johor of Malaysia). It can be speculated that the object was sitting there. In fact, whether people sit or stand can affect their expression of emotions. For example, when considering something on a seat, people often bend forward with an elbow on the table to support his head with the same hand, which differs from the situation when he is standing.	Posture
14. children sulking	‘I have seen them constantly do so – Man sometimes and woman very frequently’ (Stack, New Zealand).	Gender
16. sign of silence	Robert Swinhoe observes that the Chinese put the index finger of the right hand against the crowd. ‘Silence is however oftenest ordered by the voice’ (Swinhoe, China). This expression is used when there are crowds. The expression varies depending on whether it is quiet or noisy, a public or a private space. Many other informants replied that silence is ordered by sound, but they do not report on the influence of place.	Place

The impacts that led to the above distinctions in expressions can thus be attributed to a variety of factors, including individual differences, gender, age, race and social status. The posture and place factors noted in response to Questions 13 and 16 both contribute to individual differences. Swinhoe noted the differences in physical features between Chinese and European peoples, and took social status into consideration. Table 2.10 only provides part of the evidence for cross-cultural variety, listing only one example for each question. Even in these few samples, we can see that gender is a factor that is repeated three times – in Questions 1, 12 and 14. It is impossible for Darwin to have omitted all these cases by mistake, especially when he was writing about sex selection in the *Descent of Man*, in which the subject of emotional responses was once a chapter. As Ekman (1972) points out, Darwin’s data from one country is too small to get his conclusion. It is not our job to ask Darwin to gather more data, but rather to analyse why he has neglected so many negative results of the same kind. All the above factors have the same affect – they undermine the thesis of the uniformity of emotion and impede the verification of the second hypothesis.

### 7.3 Sound and speech

As we have seen, sound and speech receive little mention in the *Expression of Emotions*, although some cases relating to animal and infant emotions are noted in Chapters IV and V. Is it a lack of data that leads to the absence of human voices in the

second half of the book? Table 2.11 suggests a negative answer to this question in the evidence from the Asian letters. The two columns have the same functions as those in Table 2.10 above.

Table 2.11 Sound and speech in emotions

Emotions	Observations
1. astonishment	<p>(1) 'Calling out 'Ake Indai' (oh! Mother)' (Brooke, Sarawak).</p> <p>(2) 'a peculiar noise made with the mouth as if articulating the word "clock"' (Lacy, Queensland of Australia).</p> <p>(3) 'Making a noise with his mouth as if he were blowing out a match' (Smyth, Melbourne of Australia).</p> <p>(4) 'Make an exclamation 'Kooke', to do so the mouth is drawn up as if going to whistle' (Bulmer, Melbourne of Australia).</p>
3. indignant or defiant	<p>(1) 'assails him with a volley of "dang" and then appeals to the justice of the fast-gathering crowd' (Swinhoe, China).</p> <p>(2) 'young men show rage by blustering and talking loud' (Brooke, Sarawak).</p> <p>(3) 'spoke very rapidly' (Bulmer, Melbourne of Australia).</p> <p>(4) 'But immediately he begins to speak he loses the stiff set and tries to express his rage by the violent action of every part of his body' (Stack, New Zealand).</p>
7. sneers or snarls	<p>Speaks quite quickly and emphasizes the last sentence (Lacy, Queensland of Australia).</p> <p>'speak with the teeth closed, the upper lip drawn to one side and a general angry expression of [the] face looking directly at the person addressed' (Bulmer, Melbourne of Australia).</p>
9. contempt	<p>'They also utter a sound like 'Esh', showing contempt, and the word 'Cheh' or 'Eh' from the throat expresses disbelief or equivalent to nonsense, humbug, and etc.' (Brooke, Sarawak).</p>
10. disgust	<p>(1) 'Disgust is expressed (particularly by Malays) by spitting out the word 'Poeh' or Po-he. Dyaks often utter a guttural sound and say 'Baka Jelu' (like a beast). These sounds I think a stranger would find it impossible to pronounce as natives, as the 'h' is so thrown away from the mouth'(Brooke, Sarawak).</p> <p>(2) 'uttering an "Ugh"'(Lacy, Queensland of Australia).</p>
13. cannot prevent something being done, or cannot himself	<p>'Would not trouble himself and would say he was not clever or lucky' (Brooke, Sarawak).</p>

do something	
16. sign of silence	<p>(1) 'the index finger of the right hand put against them. Silence is however oftenest ordered by the voice' (Swinhoe, China).</p> <p>(2) 'The Dyak word for silence is 'Diau' – They do not 'hiss' to express it' (Brooke, Sarawak).</p> <p>(3) Mr West's answer is almost the same with the Chinese case that the Indians point the index finger of the right hand, uttering a 'ch' sound (West, India).</p> <p>(4) 'so by some; by others also a sound like the low cry of cattle' (Hagenauer, Lake Wellington, Australia),</p> <p>(5) 'at the same time silently uttering the words 'Woo lart ba worl' which means be silent. I have also observed [that] when they wish to stop a noise they give a sudden "Yah"' (Bulmer, Melbourne of Australia).</p>
17. affirmation and negation	<p>(1) Mr West says that some threw the head backwards and gave a cluck of the tongue.</p> <p>(2) 'but the word (Baal) or (Ara) meaning "No" [was] used as negative, without any lateral inclination of the head' (Lacy, Queensland of Australia).</p>

As we can see, many human emotions are here reported as being expressed with sound, and there are many such observations provided to Darwin in the respondents' letters. The materials that we so far hold are sufficient to answer the question raised at the beginning of this chapter: why did Darwin delete Question 16 from the published query in the book? Based on the evidence provided in Table 2.11 above, the removal of Question 16 on hissing can be explained by two considerations. As seen from Table 2.11, the several sounds reported in response to Question 1 on astonishment differed from each other on the basis of cultural and social backgrounds, thus opposing uniformity, and the other emotions encountered the same problem. However, with particular respect to Question 16, Darwin asks whether a gentle hiss is uttered as a SIGN to keep silent? However, despite a large number of simple negations to the question, most of the detailed answers referred to sound and languages, which are about communication rather than Darwin's presumed 'sign'. Table 2.6 in Section 6.1 showed that the answers to Questions 5 on low spirits and Question 13 on shrugging were more negative than that of Question 16 on hissing, but these questions were preserved in the published version of the query. So, the primary problem that Darwin confronts with Question 16 is linked with the sound and the communication accompanying it. Radick (2010) has noticed the non-functional description in the *Expression of Emotions* – that Darwin rejects the communicative function of emotion. A deeper understanding of Darwin's strategy points to the association between communication and its social and cultural background, in which languages,



conventional signs and gestures are generated. By abandoning the communicative function, Darwin isolates emotion from people's social lives in order to make it the product of his habitual-association principles. With such a physiological framework connecting an individual's mind with his body, there is no space for the role of the social and cultural environments as backgrounds or stimuli for emotions.

#### *7.4 Continuity and changes in expressions*

In some cases, an expression can be an ongoing process rather than the momentary event that Darwin describes all expressions as. As John Scott in India observes, we can grasp an expression's continuity in many interactions. Scott reports:

'I purposely raised a quarrel between two Mechis by making a present to one of the whole of a few pence which I had promised to divide between them, and telling the other that he might get his share as he best could. I having previously cautioned the recipient against giving it up. This had the desired effect; both ultimately got into a violent passion – As they warmed on the argument, I observed that their bodies became less erect, (withdrawn below) the head pushed forward strong grimaces, shoulders raised, arms rigid, bent at elbows, hands turned into body, their backs facing opponents, and somewhat spasmodically closed (not clenched—the third joint unbent the middle and distal phalanges being simply pressed on palm while the thumb is bent upon the proximal phalange of the first finger and not placed slanting across and in opposition to the three fingers. They continued thus for several minutes approaching and withdrawing from each other; and frequently lifting their arms as if they would strike' (Scott, India).

Scott states that, 'as they warmed on the argument' he observed serial bodily changes, which 'continued thus for several minutes'. Such gradual changes in emotions and their expression can, as a matter of fact, even be read from some chapter titles of the *Expression of Emotions*. For example, Chapter VI is entitled *Suffering and Weeping* and Chapter XII *Surprise—Astonishment—Fear—Horror*. Can we hope that the detailed description of some distant races, as Scott provided from India, is reflected in the content of these chapters? The answer is disappointing – what is extracted from those query answers is just the material that can provide a simple confirmation of racial universality. Beyond that, the abundant details contained in the responses, although encouraged by the questionnaire's instructions, are simply discarded.

Furthermore, the Asian letters suggest that passive emotions usually last longer than the positive ones. The expressions change throughout the duration of these emotional

experiences, and can sometimes even turn into an expression of the opposite emotional state. Swinhoe reports that, in China, ‘in hearing of some distressing case of death, or in telling the same to another, they often go into a hysterical fit of laughter, especially women, and indeed have felt myself a curious inclination to laugh on similar occasions’ (Swinhoe 1868). In this case, not only does Swinhoe observe that the expression transforms from looking stricken to laughing, but he also mentions the custom and social influence on the observer himself, an alien in the environment of China. The latter finding is omitted by Darwin in citing the first part of Swinhoe’s answer, discussed in Section 4 above. Both the continuity and the transition of the expression add to its complexity.

### *7.5 Expressions changing with civilization*

Some informants are availed of the opportunity to compare emotions in tribes or nations that differ with each other in terms of development of their civilization. Table 2.12 notes such testimonies in relation to five emotions on the 1867 query. The two columns represent the same factors as the table above.

Table 2.12 Expressions affected by civilization

Emotions	Observations
2. shame	John Scott observes that shame is diversely expressed, and that ‘up country tribes had [a] less abject posture’ (Scott, Kolkata of India).
3. indignity or defiance	‘In anger the mouth if firmly closed nostrils distended and the man picks up the first thing at reach to hurl at the person against; in deliberate anger, more like we do. They are incapable of mental exertion’ (Bulmer, Melbourne of Australia).
5. low spirits	‘they feel acutely, and in most instances let their feelings have full play in grief, even to the enjoyment of it’ (Brooke, Sarawak).
6. good spirits	‘a grin which shows his teeth all the face in a smile. As a rule Blacks are very impulsive, they are like children very easily pleased and its opposite. When a Black’s wants are all supplied and he has health he is generally in good spirits.’ (Bulmer, Melbourne of Australia)
11. fear	(1) West observes that in Mumbai, India, the expressions of natives are more exaggerated than those of Europeans. (2) ‘but more exaggerated’(Glenie and Thwaites, Sri Lanka).
12. laughter	‘the Blacks have a keen sense of the ludicrous. They are excellent mimics and when one imitate the peculiarities of some absent member of the tribe, it is very common to hear all in the camp convulsed with laughter. With Europeans

	hardly anything excites laughter so easily as mimicry and it is rather curious to find the same fact with the savages of Australia, who constitute one of the most distinct races in the world' (Bulmer, Melbourne of Australia).
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I think the above results were the most undesirable ones that Darwin would have sought from his global survey. An obvious fact that he keeps ignoring is that a nation's (or a generation's) emotions, as well as its expressions, continue to change as its society changes and develops, for instance, in terms of living conditions and cultural developments. They also change within individuals, as the basic emotional lives of infants become more advanced and complex as they move towards adulthood, and the expressions they learn from their social environments also become more nuanced. Changes of the former kind would have more likely been addressed by Darwin in his physiological (non-cultural) ideology.

Again, Darwin only focuses on the responses that contribute to his model of the uniformity of emotional expression, and consequently the differentia of expression between human races are overlooked. For instance, with respect to shame, Darwin only cares about common blushing, even though John Scott makes a report to Darwin detailing its diversity: 'up country tribes had [a] less abject posture'. The evidence given in Table 2.12 above illustrates such emotional divergences as a result of civilization. Generally speaking, the less developed tribes and nations are more easily pleased, and their expressions are more free and pronounced. People in modern society, by contrast, have more passive emotions, having learnt to control their expression of emotions. Such distinctions between civilizations certainly relate to social, cultural and even religious influences, which go beyond what Darwin intends to or is able to explore.

We have now summarized the types of negative results contained in the Asian letters. None of these are reflected in the *Expression of Emotions* due to the goals of Darwin's emotional study and the constraints put in place in his questionnaire (see Part I). Darwin's publication bias in writing the book has been clearly shown. What then can we expect from an emotional survey that is free from such constraints and presumed hypotheses? We can consider two better cases of independent scientific studies that were immune from British influence, and which conducted in-depth research into Chinese literature. The first was undertaken by Swinhoe's colleague, W. F. Mayers,<sup>93</sup> who conducted research into the history of maize, performing an in-depth study of Chinese documents containing native discoveries (Fan 2004: 98). The second was undertaken by Swinhoe himself during his exploration of Hainan. At that time,

<sup>93</sup> Mayers was a sinologist and Vice-Consul at Canton in the 1860s.

Swinhoe was able to access local chronicles and cited a large number of texts in his ornithological article.<sup>94</sup> To unload the constraints in the Sino-British network affecting information exchange, we may consider if Swinhoe made any voluntary observations on Chinese expressions before taking part in Darwin's questionnaire survey in 1867. After reading Swinhoe's publications and correspondence with Darwin, we find that he did indeed do so in 1860, and the records of this were sent to Darwin. They are now stored in his Down House<sup>95</sup> in Kent.

#### **Part IV: A better report from Swinhoe as a correction to Darwin's publication bias**

### **8 Swinhoe's further findings on Chinese emotion: what can we expect from an unconstrained observer?**

As mentioned in Part I, Swinhoe acted as an interpreter during the Second Opium War (1856–1860) and published his war diary as the *Narrative of The North China Campaign of 1860* (*Narrative* for short). After receiving a first edition of the *Origin of Species* (1859)<sup>96</sup> from Darwin, Swinhoe sent back a copy of the *Narrative* in return.<sup>97</sup> Its subtitle is '*containing personal experiences of Chinese character, and of the moral and social condition of the country*'. Swinhoe writes in the preface:

‘In reading descriptive narratives and accounts of travels, I have often wished that the writers, instead of pitching upon the salient points alone for narration, had given a fuller detail of all the minor occurrences; which, though unimportant in themselves, often reflect light upon the chief events, and give a continuity to the whole. This I have tried to accomplish in the following work; and though some readers may consider such parts uninviting and of small import, there may be others who will be thankful for a full and truthful narrative’ (Swinhoe 1861: iii).

I think we should be thankful to Swinhoe's scientific spirit in taking these notes and presenting ‘minor occurrences’ in the *Narrative*, because abundant details on Chinese expression can be learned from it. At that time, he could never have imagined that this work would have anything to do with Darwin's request about emotions, and during their communication on the query, the book had already been forgotten. When replying to Darwin's questionnaire in Hainan, Swinhoe wrote that, ‘but I was not long enough

<sup>94</sup> See Footnote 63 above.

<sup>95</sup> Down House was Darwin's home from 1842, where he produced his most significant books, including the *Expression of Emotions*. Its address is Luxted Road, Downe, Kent, UK, BR6 7JT.

<sup>96</sup> Being acknowledged in this book, Swinhoe was on a list of ninety persons to receive a first copy from Darwin's publisher.

<sup>97</sup> The book was sent with a letter on 29 July 1863 from the Oriental Club, Hanover Square, London. Table 2.1 shows that Swinhoe was on sick leave at the time.

among them to remark any peculiarities of expression' (Swinhoe 1868). The *Narrative*, though written ten years earlier, reaches the requirement according to Swinhoe's wish. Part I summarized two constraints on Swinhoe's contact with Darwin on emotion. The first was that Swinhoe's observations in China were instructed by the fixed questions from the questionnaire. The second was that the physiological framework of the *Expression of Emotions* and Darwin's belief in universality could lead to the selection of data. Part II showed the content from the Asian letters that was contradictory to Darwin's universal ideology, and the *Narrative* functions here to reveal other constraints and show what an unrestricted observer can provide relating to the cultural and social basis of the expression of emotions.

#### Distinctions between ethnic groups

In Swinhoe's first two letters (1867, 1868) answering Darwin's query, he explains how the Chinese are divided by social classes into the 'Coolie' and the 'Literati'. In the *Narrative*, the first and foremost tag of Chinese people is their ethnic groups, and Swinhoe also mentions that there are three main peoples in the Chinese population: Manchu, Chinese and Mongolian. The Second Opium War took place when China was in the Qing Dynasty (1636–1912) and, during this period, the northern Manchu dominated China, including Xiamen and Taiwan, while the majority were comprised of the Han people, as has been the case throughout Chinese history.<sup>98</sup> Swinhoe calls the Manchu 'Tartar', and the Han people 'Chinese'. As a Nomadic nationality, Manchu have their own ceremonies, and do not learn as much Confucianism as Han people do. Thus, they have different habits and cultures, and Manchu express their emotions more openly. In describing the diverse expressions of soldiers, Swinhoe heaps high praise on the bravery of Mongolians. Such distinctions between ethnic groups are completely left out in his formal answers to Darwin's query but, in the *Narrative*, whenever he talks about Chinese people, Swinhoe always identifies his/her nationality first.

#### More information on social positions

In Swinhoe's letters to Darwin, the expressions of the higher ('Literati') and lower ('Coolie') classes are often noted through one assertion – that they express emotions differently. The *Narrative*, by contrast, contains vivid descriptions of the distinctions between people from various social positions:

'The ordinary business of the street-vendors and stall-keepers continued with the

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<sup>98</sup> In most of Chinese history, the Han people have been the governing class.

usual alacrity, and the lower classes laughed, grumbled, and scolded one another, clad in frowzy old rags, yet happy withal. The more respectable inhabitants, however, dressed in their long blue frocks, might be seen grouped together, looking anxious and unhappy' (Swinhoe 1861: 189–190).

This shows how people's fortunes and social statuses determined their reactions to the war, and were reflected in their emotional behaviours. Moreover, people are also divided like this in Confucian doctrine, and are offered different teachings and guidance to reflect their different characteristics, statuses and needs.

In addition to this, Swinhoe also noticed that people's experiences and professions led to different expressions:

'All this, it will be argued, shows no lack of pluck in the Chinese character when opportunity is given for its demonstration; but we must not forget that the people from whom these corps were taken were mostly thieves or pirates hardened to deeds of blood, and depending largely upon such acts for their maintenance' (Swinhoe 1861: 139).

Swinhoe's observation here seems to be that the crueller criminals tend to behave, the more negative their emotional expressions are.

### Expressive eyes

In Darwin's questionnaire, the only question about eyesight (i.e. about the eyes themselves rather the movement around the eyes) is Question 6: 'whether eyes sparkle in good spirits'. However, because the question is too long, and covers other parts of the face, most informants, including Swinhoe, did not pay much attention to the one-sentence concern of the eyes. Thus, few effective findings can be extracted from the letters on this expression, and this is reflected in the *Expression of Emotions*. However, it is almost a matter of commonsense that the eyes play an important role in expressing emotions. Whilst most of the informants neglected this in their responses to the pre-designed questionnaire, what can we expect from a liberated observer?

Table 2.13 below provides Swinhoe's descriptions of the expressiveness of eyes from the *Narrative*. The first column provides the page numbers in the *Narrative* that the observations in the second column come from.

Table 2.13 Swinhoe's records on the expressiveness of eyes

Page numbers	Swinhoe's records in the <i>Narrative</i>
41–2	'How each rascal's eyes glistened when his apportioned sum was counted into his hands!'
28	'The driver, with a large flat face and squinny eyes, stares at you with a look of mingled fear and surprise.'
176	'This individual, ... with a funny leer in his eye'
219	'The former is a tall, dignified man, with an intelligent countenance, though a somewhat unpleasant eye.'
269	'in reply, he returned me a vacant stare, and shrieked menacingly at me.'

The above quotes highlight just some of the ways that eyes are closely tied with the expression of emotions. The observations in the first row of Table 2.13 (page 41–2 of the *Narrative*) would have made a wonderful answer to Question 6 of Darwin's query. Also, every one of us can make such observations on the expressiveness of eyes. However, Darwin's discussion of this problem in the *Expression of Emotions* is very dry, general, and lacking in detail.

#### A group's expressions and an individual's expressions in a group

Since the *Narrative* was written during the time when Swinhoe was in the army, he was able to observe quite a lot from a group of soldiers' expressions, and how they changed in response to the presence of their leaders. For example, the arrival of the general, Lord Elgin, encouraged the army's spirits (p. 33) – a phenomenon also seen in other mammal communities, e.g. with a wolf's leadership. Swinhoe also noticed that people's expressions could be contagious within a group (an army, in this case) – that 'great consternation prevailed' (p. 100), and that 'the excitement on the occasion, which is truly contagious, soon obliterates all the finer feelings of humanity, and makes you exclaim with the rest...' (p. 92). It is also suggested in the *Narrative* that individuals in a group are inclined to imitate the behaviours of the leader or more experienced companions: 'Quite verdant in the usages of war, and seeing an old campaigner so alarmed, I naturally shared the contagion; but being loath to part so easily with my valuable steed...' (p. 88).

Such 'contagion' is, in fact, a reaction to others' emotions. As a kind of social behaviour, it is not unusual to see it in other emotional expressions, such as with laughter and sorrow. In answering the fifth question on Darwin's query, Swinhoe reports a case of contagious laughing: 'But in hearing of some distressing case of

death, or in telling the same to another, they often go into a hysterical fit of laughter. This in a less degree I have seen with English people, especially women, and indeed have felt myself a curious inclination to laugh on similar occasions' (Swinhoe 1868). It should be pointed out that the contagious phenomenon does not need the participation of emotion, but can occur in non-emotional behaviour, like in the contagion of a yawn. Swinhoe then offers a rough explanation of the social expression: 'I tried to explain to him that this daring conduct was a good deal owing to discipline' (Swinhoe 1861: 161).

### Cultural influences on emotion

As well as contrasting the Nomadic Manchu with the agricultural Han in relation to their cultural backgrounds and traditions, Swinhoe also points out that cultural factors lead to differences between Chinese and European expressions. Chinese people 'have not the inherent pluck and love of danger with which the European races are endowed' (p. 141), and some special expressions of Chinese people are induced by their tensions with the government – 'they showed great timidity as to the probable result of doing so, pointing to the city and passing their fingers across their throats' (p. 22). In Europeans, religious belief may have had a suppressive effect on their expression – 'the fear of future retribution among a Christian people may too often tend to cow the bravest spirit; but to one who expects no future, the blank presented to the mind has almost invariably a worse effect' (p. 140). Besides, Swinhoe observed that some expressions were fixed to become a kind of ritual in the cultural environment. To express sadness for the dead, 'All the house-hold were dressed in white weeds, and weeping round the corpse as if their hearts would break' (p. 25). Similar ceremonies also exist in other higher-order mammal societies, such as in monkeys. How was the expression fixed to become a convention and, inversely, how will the ritual and religion affect people's expression of emotions? The answers to both of these questions have their roots in the cultural backgrounds of the relevant races or social groups.

### Consciously calling up or suppressing emotions

When the army was preparing for a forthcoming campaign, 'everyone looked excited, but you could see that there was an uneasiness in their minds. All tried to laugh the matter off, and to appear cheerful, lest they might betray their feelings' (p. 128). As a temporary member of this group, Swinhoe recited Addison's poem to inspire courage in them. It is usual for a lonely person to sing or make some sound when feeling frightened on a dark road. Poems are also chanted to express emotions in some



circumstances. Chapter 4 will introduce an American psychologist who used this method to produce emotions, and to photograph them for their use in recognition experiment.

#### The relation between expression and the (mental) health conditions of the subject

For many adults, their expressions of emotion vary as they experience different health or psychological conditions. Swinhoe describes how people addicted to opium were indifferent to daily life and expressed much fewer emotions than normal (p. 140). Reversely, the effect of emotion on the body is likewise mentioned: ‘one old weather-beaten greybeard could scarcely stand from the agitation that shook his frame when he was told that 70 dollars were allotted to him’ (p. 42). The effect of emotions on the human body can also be seen in Darwin’s query in relation to Question 11, where it is asked whether extreme fear causes a pale face and trembling, and in Question 12, where it is asked whether excessive laughing leads to tears. Research on this psychophysical correlation was undertaken in the late Nineteenth Century school of psychology, and will be discussed further in Chapter 4.

Swinhoe’s *Narrative* raised some new possibilities in emotional study. In addition to the above findings, Swinhoe described some new types of emotions as a supplement to those listed in the *Expression of Emotions*. Take ‘greediness’ as an example. This is ignored by Darwin, but portrayed in Swinhoe’s records – ‘but with what avidity these poor wretches dived into the jars with their naked arms, and threw the mess into their bags!’ (p. 69). The expression of greed here occurred when ‘these poor wretches’ experienced fortune. Apart from this new emotional type, more causes and conditions are appended to the shedding of tears and other expressions in Swinhoe’s work than are given in Darwin’s discussion. Besides, we can all enumerate numerous conditions that arouse from weeping and smiling. This can help us to understand Darwin’s focus on uniform types of emotion and their universality among races.

#### Conclusion

This chapter has attempted to draw two interactive maps. The first is of the Sino-British network in the late Nineteenth Century (Part I). Focusing separately on Swinhoe’s three roles as diplomat, ornithologist and botanist enabled us to grasp the activities occurring in each community and the characteristics of their communications. As Fig. 2.2 (in Section 1.2) indicated, Swinhoe’s communication with Darwin took place alongside both his consular activity and his ornithological fieldwork. The same was true with relation to their communication on emotional expression. First, Swinhoe

observed the natives' expressions of emotion during an official expedition to Hainan. Second, the locations from which he replied to Darwin moved from Xiamen, South China, to Peking in the North. In his responses to the questionnaire, the discussion encompassed, and was often interrupted by, ornithological information. For example, the major content of the first letter Swinhoe sent from Xiamen in 1867 concerned ornithology. It wasn't until one year later, with the second letter in 1868 from Beijing, that Swinhoe formally answered the query.

The Sino-British network included a number of scholars, but the relationship between the three fellows of the Royal Society – Swinhoe, Darwin and Hooker – offered us the chance to examine the flow of money, information and specimens in this network. The British scientist-diplomat network centred on the former, who sent out instructions and received information and specimens from the latter. Their exchange was on non-equal terms in that the information and observation provided by diplomats was seldom paid for by the scientists. The comparison between Darwin's and Hooker's networks (Fig. 2.5) revealed the constraints in Darwin's informational exchange (Fig. 2.6), which is reflected in the second map of Darwin's publication bias in dealing with the questionnaire data.

The second map was first drawn in Part II through an inquiry on Chinese emotion using Swinhoe. As an outcome of the Sino-British network, the non-equivalent exchange had effects on both sides. The first was that Swinhoe's observations of Chinese emotions were instructed by Darwin's query. Most of the reported answers provided no detail and were not cite-worthy. The second was that Darwin's handled Swinhoe's responses by claiming that 'the expression is natural to mankind' no matter how much the answers differed from those that would be expected for this conclusion to be drawn. Darwin's citations of Swinhoe's replies reveal five characteristics of Darwin's handling of this data.

Part III then extended the scope of the map using the Asian responses to Darwin's questionnaire. The fuller view of Darwin's publication bias has two dimensions, one relating to the types of negative results that Darwin received, the other to how he dealt with these data. With respect to the first dimension, the negative results contained in the Asian letters are introduced in relation to the subdivisions, similarities and overlaps between emotions and the continuity, transition and individual differences between their expressions. The last feature is the way that expressions progress with civilization. The negative results can be classified into two general types. The first type involves those that break with the uniform emotional types presupposed by the questionnaire. The second are those that conflict with the second hypothesis – racial universality.

With the second dimension of the publication bias, what Darwin sought from the received letters was simply answers confirming the questions in the query. However, although he had asked for detailed answers, no matter how many details were actually provided, the *Expression of Emotions* only cites that information and those answers that provide a confirmation of racial universality. The other information is not seen as evidence, but as problems.

The publication bias is also seen in the absence of Question 16 on the emotional expression of hissing, which is due to the communicative function it involves. The sounds and signs in emotions not only increase racial distinctions, but also strongly relate to the cultural backgrounds of the subjects (see Section 7.3). Hence, the publication bias originates from both Darwin's presumed hypothesis of racial uniformity and his withholding of information that contradicts it, and the physiological framework established upon the three principles, which rejects the cultural interpretation of emotion. With the second cause, although the differences between classes are frequently discussed by Swinhoe in his letters to Darwin on emotional expression, together with the effect of custom and cultural influence on Chinese people in their drive to hide their emotional responses, these factors receive no mention in Darwin's work.

These biases were rectified by appealing to Swinhoe's *Narrative*, which discusses cultural influences on the expression of emotion and the significant role played by eyes therein. Given the author's objective 'to write a complete account of the campaign', and his scientific spirit in taking notes alongside his ornithological fieldwork (Swinhoe 1861: iii), the evidence in the book can be seen as being reliable. In the *Expression of Emotions*, Darwin also refers to many works of fiction, such as novels and poems, and it is to the function of these citations that the following chapter now turns.

### Chapter 3 Darwin's Recognition Experiments and Use of Literary Sources in Focus

Chapter 2 has explored Darwin's use of the fifth method, the Questionnaire. By comparing the global replies to the questionnaire with the published testimonies in the *Expression of Emotions*, Darwin's publication bias in order to corroborate his second hypothesis on racial unity is discovered that many types of answers which contradicted the hypothesis had been discarded. Similarly, this chapter will show that Darwin had made some revisions in reporting the results of Method 3: Recognition experiment. In contrast to the previous evidence, which was drawn from Darwin's correspondence, this time a different archive resource, Darwin's working manuscript, will be examined. Darwin's method was to recognize photographed expressions with a group of viewers, whose answers were tabulated and recorded in 1868 on three sheets of paper. This chapter incorporates a very close and detailed analysis of this document. Out of that analysis will come two important and original findings which it is well to highlight at the start. First, we will see that Darwin did not conduct his recognition experiments for the same reasons that his modern-day champions such as Paul Ekman do them, namely, in order to discover how universal human emotional expression is. Rather, Darwin conducted them in order to discover precisely which muscles were involved in the expression of which emotions — and we will see that his annotations and correspondence around the recognition-experiment document deal extensively with anatomical questions of no interest to the likes of Ekman. Second, in the transit from the recognition-results manuscript to the published book, a number of results disappeared, as Darwin represented certain data sets that were actually variable as uniform by silently dropping the discrepant results.

The first finding emerges from Part I *Darwin's manuscript and correspondence on Method 3 Recognition experiment*. It reads and analyses the information on the manuscript by two means. First, it summarizes the features of the answers and Darwin's marks to generalize Darwin's working methods. Because the marks are in different colours, we are able to learn Darwin's criteria in counting and selection of the data. The second approach is biographical research on the viewers. According to Darwin's introduction to them, their gender, age and education information is represented in a tabulated format. We then turn to look at Duchenne's book in 1862 providing the experimental materials — the photographed expressions. From Darwin's annotations to the book and later discussion with Crichton-Browne, we find out Darwin's consistent inquiry into muscular problems of human expression of emotions.

After the archival research in Part I, our study of the third method continues to Part II *Relating Darwin's recognition data to their use in the Expression of Emotions*. It considers how the experimental data are used in Darwin's book. Compared to the tabled data in Darwin's manuscript, the experiments scatter in different chapters and had not been concluded by either Darwin himself or later scholars. This part extracts the experiments from the texts and gives a summary to them. By comparing the original data with their published forms in the *Expression of Emotions*, we find that in order to bring out some arguments Darwin has often revised the proportions of correct answers.

The final part is Part III *Method 8: Literary approach*. In the *Expression of Emotions*, Darwin often extracts evidence from works of fiction, such as novels, poems, and even fables. Though this does not appear on the main list of the six methods, it actually occupies more space in the book than some of the methods on that list. This part analyses Darwin's citations from literature. It helps us to perceive Darwin's embarrassments in dealing with some problems in studying the expression of emotions. For example, it is uncovered that the examples quoted from literature often indicate the absence of observational evidence.

In the *Conclusion*, we will find that a family member of Darwin had taken part in both the two methods. He was one of the viewers to recognize Duchenne's plates and enlightened Darwin on understanding a piece of literature. At the end of the chapter, we will also provide a brief introduction to the following two chapters, Chapter 4 and 5, to explain the interlinks between them and their connection to the first three chapters.

### **Part I: Darwin's manuscript and correspondence on Method 3 Recognition experiment**

#### **1 Learning to read Darwin's original data sheets from his recognition experiments**

##### *1.1 General procedures in the experiments and the tabled data*

Duchenne (1862) galvanized facial muscles of an old man, whose skin was little sensitive, to produce more than sixty photographs of various expressions. Some plates were sent to Darwin and aroused the latter's interest. Darwin selected 11 slides from Duchenne's plates and presented them to his guests visiting his home in London and Down House, Kent. There are three procedures in the recognition experiments. The

first is presenting these photographs, without a word of explanation, to over twenty educated persons of various ages and both sexes (Darwin 1872: 14). The second is asking them ‘in each case, by what emotion or feeling the old man was supposed to be agitated’ (p. 14). Third, the descriptive words given by the VIEWERS are recorded. The results were tabulated by Darwin and marked by himself and his wife & assistant, Emma. By archival research into Darwin’s documents, Snyder (2010) provides the manuscript in three figures, Fig. 3.1-3.3 below. However, as a modern neurologist, Snyder in the short article does not explore this material too deeply before turning to Darwin’s contribution to modern neuropharmacology. The following subsections will read useful messages from this manuscript steadily from its basic content to the sequence and criteria in Darwin’s processing and selection of data, which is in preparation for a comparison with the published results in Part II.

(a)

	Am. Crofton	Lacy Wedgwood	S. J. Wedgwood	Cratch	D. J. J.	M. J. J.	W. H. W.	W. W. W.		
1. Sample	amusement	Pleasure		Laughter	Laughter	Laughter	Grinning smile	Laughter		
2. Surprise	Surprise	Surprise		Surprise	Amusement	Surprise	Surprise	Surprise		
3. Horror	Horror	Horror		Scared	Pain	Horror	Horror	Horror	6-1	Pain
4. Grief	Grief	Pain		Sudden grief	0	Pain	Contentment	Disgust	7	1 very faint
5. Pain	Horror	Fear		Calling out from sudden pain	Anger	Anger	Anger	Contentment	9	1 same as before
6. Sorrow	Sorrow	Distress		Compassion	0	Grief	Sadness	Disgust	10	1 same as before
7. Laughter	Laughter	Amusement		Amusement	Amusement	Amusement	Amusement	Amusement		
8. Sorrow	Sorrow	Distress		Sudden Sorrow	0	Curiosity	Amusement	Amusement		
9. Grief	Grief	Sorrow		To move compassion	Sorrow	Disgust	Sorrow	Disgust		
10. Horror	Horror	Horror		Horror	Sorrow	Disgust	Disgust	Disgust		
11. Horror	Horror	Horror		Horror	Sorrow	Disgust	Disgust	Disgust		

Fig. 3.1 Darwin’s manuscript of tabled data in the recognition experiments (a) (Snyder et al. 2010:163; CUL)

(b)

	Head laughs	Blythe	Surprise	Horace	Amusement	No. 8.	No. Form	Head (2)
Laughing	yes yes	no x	yes	yes	Amusement	Laugh	Laugh	yes
As surprise	yes, yes, yes	yes	no x	yes	disput + water	stupid water	fearful astonish	surprise & horror
Fright	yes, no, yes 4 3 4	yes 5	fright	3/4	pain	horror	pain & disgust	terror & horror
Surprised & grief	yes, no, yes? 3 2 3	no x	Surprised (3)	no x	intense amusement	surprise	?	incredibly surprise
Terror, agony	yes, no, yes 1 2	yes 3	pain 4	yes 5	fright	great surprise pains	stupid surprise	Terror
1/2 crying	no, no, no x x x	no x	Anger pains	yes 6	Sadness	Horror	grief	horror or wildly fright
1/2 laughing & 1/4 crying			laughing 9	both or both wrong	7 0	3 or 8 0	5 or 12 0	yes 13 yes 5

Lampy etc count  
DAR 186:27

Fig. 3.2 Darwin's manuscript of tabled data in the recognition experiments (b) (p. 164; CUL)

(c)

	Structure	Source	Horace	Amusement	Amusement	DAR 186:29	No. 8	No. 10
Laughing (1)	pleasure amusement	Laughing	wildly joy	Amusement	Amusement	Inf. S. Horne	No. 8	No. 10
As surprise (2)	Woful activities	Surprise	Surprise	astonishment	Surprise	(Half-laughing & half-angry)	1	Pain
Fright (3)	Horror	Terror	surprise horror Fright	terror	Horror	Surprise Fright	Surprise	astonish
Surprised & grief (4)	Contempt	Disgust	Contempt (3rd pain with 1/2)	Horror	Disgust	Disgust	Disgust	Pain
Terror & agony (5)	Disgust	Pain	Terror, agony	anger Pain	anger	Pain	Horror	Terror
1/2 pain crying (6)	0	crying	amusement & terror agony	pain	grief	grief & cry	Horror & surprise	Pain
1/2 laughing & 1/4 crying (7)	0	laughing	joy	amusement	laughing	laughing	astonish	laughing
Surprised (8)	Surprise, thought	0	surprise & wonder	pain	surprise	Surprise	Surprise	astonish
Surprised & grief (9)	Terror	grief	pain	grief	grief	Surprise	Horror	astonish
Surprised & terror (10)	Surprised	Terror	Surprise & horror	agony	Horror	Surprise	Horror	astonish
Head (11)						Surprised	Surprised	astonish

Fig. 3.3 Darwin's manuscript of tabled data in the recognition experiments (c) (p. 165; CUL)

## 1.2 Information read from Darwin's manuscript

### Basic content

We can see that there are three tables on the three sheets of paper (a more legible version of them can be accessed online<sup>99</sup>). Let's call the one in Fig. 3.1 Table (a), the one in Fig. 3.2 Table (b) and the one in Fig. 3.3 Table (c). In all the three tables, the y-axis stands for the photographs from Duchenne's plates. The first columns write the names of emotions. There are eleven emotions recorded in both Table (a) and (c), while only the first seven are in Table (b). The 11 emotions are No. 1 Laughter, No. 2 Astonishment, No. 3 Fright, No. 4 Despair & grief, No. 5 Torture and agony, No. 6 1/2 crying, No. 7 1/2 laughing and 1/2 crying, No. 8 Suffering, No. 9 Deep grief, No. 10 Fright & pain & torture, No. 11 Hardness. The x-axis represents the answers from the viewers. The first row in each table notes the names of Darwin's guests who participated in the experiments. The answers they gave are recorded in from the second column onwards. We can see that, in spite of the first column writing the names of emotions, each table records eight columns of answers. Nonetheless, the 24 viewers frequently mentioned by Darwin in the *Expression of Emotions* cannot be simply counted by 8 (persons per sheet) x 3 sheets, because there are two special columns in these tables. The first is the fourth column in Table (a). Though with a guest's name, Sophia, on the top, it is left blank without any answer. The other one is the second column in Table (b). The answers of three persons, who might come from one family<sup>100</sup>, are contained in one column. In all, there are 25 viewers whose answers are recorded in these tables: seven in Table (a), eight in Table (b), and ten in Table (c). Besides, there are some blank squares on the three tables. In Table (a) the last guest did not answer No. 1 Laughter. In Table (b) the first four guests (in Column 2 including three persons and Column 3) did not answer No. 7 1/2 laughing and 1/2 crying. In Table (c) only the last three guests answered No. 11 Hardness. So, only nine of the 25 viewers, including the first six in Table (a) and the last three on Table (c), recognized all the 11 photographs. Given the above information, Table 3.1 below summarizes the numbers of viewers in recognizing each photograph. In Part II we will see that Darwin often made mistakes to declare the numbers of viewers, because some viewers were discarded with their negative answers.

<sup>99</sup> Link provided via Darwin Correspondence Project (DCP): <https://www.darwinproject.ac.uk/emotion-experiment>

<sup>100</sup> Besides, the answers in the sixth to eighth columns of Table (b) must come from one family, judged from the similar names at the first row. Also, the family name of the guests in Column 6 and 7 of Table (a) is the same.



Table 3.1 The number of viewers corresponding to each emotion

Emotions	Number of viewers (from Table a+b+c)
No. 1	24 (7+10+7)
No. 2-6	25 (8+10+7)
No. 7	21 (8+6+7)
No. 8-10	15 (8+0+7)
No. 11	11 (8+0+3)

### Format and order

Before we start to examine whether the differential information of the eleven experiments is correctly presented in the *Expression of Emotions* in Part II, it is necessary to know the criteria in Darwin's processing and selection of the data. The first step to know Darwin's working method is to make out the order of the three sheets in time sequence. The above alignment, a, b, c, was given by Snyder (2010) for the three images, but we should not take that for granted. To reach the fact we may have two approaches. The first is judging from the format and marks of the three tables. The second is a historical inquiry into the information of the guests to see when they were interviewed. Below I will do both because each of these means can offer us valuable information either on the content of the sheets to uncover the author's working method or on Darwin's social activities that were relevant to his study of expression. First, we shall have a look at the format of the three tables that the top and bottom lines of Table (c) are handwritten while all the lines in Table (a) are quite straight, maybe drawn with a ruler. It indicates that Darwin was more prepared to compose Table (a) which should be tabulated in the third place. In contrast to the other two tables, it is less hard to determine the place of Table (b) because, firstly, all its lines are handwritten, and, secondly, it just contains the first seven emotions as in the other two. With the crudest shape and the least content, it can be supposed as the earliest one in the three tables. This decision, nonetheless, will conflict with the pencil mark ② on its right top corner. As we can see, on the same corner of each table, there is a circled number: Table (c) is marked ① as the first one, Table (b) ② as the second one and Table (a) ③ coming the last. What does this sequence suggest?

The meanings of the numbers and symbols on the sheets to see the sequence and criteria in Darwin's counting of answers

To answer this question, we need to take other information on the three sheets into consideration. The messages on these folios can be classified into two types: the main

content and the editors' marks. The main content includes the emotions in the first column, the guests' names at the first row and their answers in the columns. In addition to them, there are numerical marks and symbols, like '1' and 'x', in most of the answer rows (starting from Row 2 — answers to No. 1 Laughter). In general, the numerical marks are used to count the same type of answers, while the 'x' is crossing off incorrect answers. Besides, the value of numbers on each table increases from the left to the right side. And, more importantly, the value at Table (c) continues to Table (b) and then to Table (a). For example, in Table (c) the final answer to No. 4 is marked ②, then ③ appears at Column 4 in Table (b), and finally the last column in Table (a) ends with a ④. It means that there are four 'guilt' answers. Seeing also the row of answers to No. 6 1/2 crying<sup>101</sup>, in Table (c) the row is marked '1' to '5', and in Table (b) '6'-'9', finally in Table (a) '10'-'14'. The last example we can give including all the three tables is the last row of Table (b), No. 7 1/2 laughing & 1/2 crying. The numbers for 1/2 laughing in Table (c) are '1' to '8', in Table (b) are '9' to '13', finally in Table (a) are '14' to '19'. The successive value of numbers in the three tables can evidence that when summing the number of answers, Darwin started from Table (c) and ended at Table (a). We also notice in the last two examples, the rows of answers to No. 6 and No. 7, that the marks are counting the number of positive answers that need not to be exactly the same. For instance, the first two answers to No. 6 at Table (a) are 'sorrow' and 'distress' marked as '9' and '10', and the final three, '12'-'14' are 'grief', 'pain' and 'misery'. The answers to No. 7 1/2 laughing are even more diverse: 'laughing' ('2', '5'-'9'), fun ('3'), glad ('10'-'13'), laughter ('14') and amusement ('1', '4', '15').

#### The disappeared blue marks in the face of more complex types of answers

Another interesting fact is that the blue crosses 'x' only appear in the first three rows of answers in Table (b) and (c). From the row of No. 4 downwards in these tables and in all the rows of Table (a) there are red crosses only. Furthermore, there is no number marked to the first three answer rows<sup>102</sup>. It seems to indicate that, Darwin at first did not use the red pencil because the types of answers to the first three emotions are countable by mind. For, the answers received to No. 1-3 in Table (a) are all positive that need no extra effort, while only the several negative answers in Table (b) and (c) wanted to be crossed off by 'x'. When Darwin proceeded to No. 4, after using two number formats (1) and ① in black pencil, a red pencil was necessary to count additional answer types. From then on, the incorrect answers were all crossed off in red. At the same time, the successive numbers are mostly written by the blue pencil.

<sup>101</sup> Not the one bound with 1/2 laughing in No. 7.

<sup>102</sup> In Table (b), the four numbers, '3', '4', '5' and '6', marked on the row of No.3 had been scratched out. For Darwin muddled this row with the one below it when counting the answers to No. 4 from Table (c) to (b), as can be seen from the same numbers saved in the right row — No.4 at Table (b).

The only exception is No. 5, just under the changing row, in which the numbers are still written in the same two formats as in the row of No. 4 without any red cross. This is because there is no diametrically negative answer replied to the emotion. Notwithstanding that, it is still a fact that No. 4 and 5 saw the changing methods of Darwin that a new pencil, the red one, was used to replace the black one, so that a single format of number, '1, 2, 3', was enough in counting the following answer types. By this means, the lower half of the three sheets are kept tidy and the information remains clear.

Darwin's consistent counting of the answers should follow the resequencing of the three sheets

The consistent use of pencils in No. 1-3 emotion rows as a whole (only blue 'x'), No. 4 (three colours) and No.5 (only black numbers and no cross) through the three sheets tells that, in each row the numbers and symbols were marked at the same time without interruption. It shows that before the first blue cross was marked on the fourth answer to No. 1 Laughter, Darwin had already sequenced the three sheets. A fact that may be omitted by some readers, like Snyder (2010), is the revision of order between Table (a) and (c). As can be seen from their top right corners, the original numbers, ① and ③ in black, are marked off and switched over by a blue pencil. An interesting question is when Darwin did this. Given the above findings that a blue pencil was at first used in handling the first three emotions and its uninterrupted usage from Table (c) to Table (a) which coincides with the order indicated by the blue numbers, I would like to suggest that the revision of order should precede Darwin's summation of answers with the same blue pencil. It may happen just before Darwin put the cross on the first negative answer to No.1 emotion, Laughter, at the fifth column of Table (c). I hope this short inference can help to vividly show Darwin's working process in handling data.

Conclusion of the two orders

Finally in this section, we would like to conclude the two orders in Darwin's recording and processing data. Seeing the first columns of the three tables, in Table (c) the emotions are numbered afterwards; in contrast, in Table (a) the numbers are formally written preceding the emotions; while in Table (b) the emotions are not numbered. These features accord with my above comparison between the three tables to further confirm the best layout of Table (a) and the roughest of Table (b). Thus we can finally conclude that they should be tabulated in the sequence of Table (b) the earliest, Table (c) the middle and Table (a) the last. Table (b) is a rough draft recording the first interviews of Darwin to recognize Duchenne's plates. This fact can be seen from not

only the fewer (seven) emotions enquired but also some unique answers in its first four columns, ‘yes’ & ‘no’. At the beginning of the *Expression of Emotions* introducing the six methods, Darwin claims to have shown ‘several of the best plates, without a word of explanation, to above twenty educated persons ..., asking them, in each case, by what emotion or feeling the old man was supposed to be agitated; and I recorded their answers in the words which they used’ (Darwin 1872: 14). This introduction of his procedures and the question asked coincides with most answers in the three tables except for Column 2-5 in Table (b). In these four columns the majority of answers are just ‘yes’ or ‘not’ rather than ‘emotion or feeling’ in Darwin’s statement and in the other columns. Therefore, the question for these guests was different from the one asked subsequently. It implies that the first several interviews did not follow the declared procedures, and affirms that Table (b) recording the unusual results should be the earliest one among the three tables. The initial question replied by a ‘yes’ or ‘no’ can be inferred by us as: *Is it the right emotion on the old man’s face?* In this case, each of the seven photographs when shown to the guests must accompany a name of emotion as listed in the first column of Table (b). There can be a ‘right’ in the question because a ‘wrong’ was answered to No. 7 at Column 5, though ‘no’ was oftenest used in other negations. We can also perceive that Darwin changed the question from *Is* to *What* at the middle of Column 4. It is No. 3 Fright in this Column that began to note the emotive term instead of ‘yes’ until the last row of No. 7. Nevertheless, the following column still records either ‘yes’ or ‘no’. Together considering the blank column in Table (a) with a prewritten name of ‘Sophia’, we can surmise the habit of the editor that a group of scheduled guests would have their names written on the sheets prior to their visits, whereas some of whom may break the appointment, e.g. Sophia, and some may leap in recording, such as the guest in Column 4 of Table (b). Below we are trying to provide more information on the guests from the editor’s diary.

### *1.3 Information on the contributors*

#### Editor or editors?

The first thing we have to make out is the authorship of the three tables, in order to determine whose archive we should look at. There is no doubt that Darwin participated in writing most parts, judged from the elderly scrawls identical to his other manuscripts. A careful reader, Snyder (2010), suggests that ‘the more legible ink pen writing (several columns on the left side of page 1, Figure 3.1) was by Darwin’s wife, Emma, and all other writing in pen and pencil (including red and blue pencil marks) appear to have been written by Charles’ (p. 162). Generally we accept Snyder’s idea, but it needs to be modified with a suggestion that the content of Column 5, though

written by a pencil, should also be attributed to Emma<sup>103</sup>. From Emma's diary, we have found the notes on most of the visitors.

### Information on the guests to reveal the dates and sequence in recording

The first interview took place in March 1868 when Darwin and Emma were in London (DCP). By the end of this month, they had been visited by all the guests in Table (b), starting from their cousin Hensleigh Wedgwood and his two sons on 22nd and until the last London visitor, Darwin's naturalist friend George Henslow, on 31st (DCP). In the first two days, the interviewees (Column 2 and 3) were only consulted with six emotions. No. 7 was added afterwards and the question was changed from *Is* to *What*. Due to the haste of time (in just 11 days), the answers were roughly tabulated with fewer emotions investigated. After they came back to Down House, Kent in April, Darwin included three more emotions on a finely drawn Table (c). When the sixth Kent visitor Miss Susan Horner arrived in August, the last emotion No. 11 Hardness was added to the list. Darwin's experiments closed with the last interviewee, sculptor Thomas Woolner on Thursday 19th November of the same year (DCP), whose answers were recorded in the last column of Table (a). According to this sequence, Table 3.2 below lists the names of all the visitors. The first column writes the three tables in time sequence from (b) to (a). The other columns record the names that are structured the same as in Darwin's manuscript, starting from the three Hensleighs until the last visitor Mr. Woolner. Sophia Wedgwood, as the only non-viewer guest, is also included to keep the table intact with eight columns on each row. Since Darwin has deliberately mentioned in the *Expression of Emotions* that the participators of the experiments are 'above twenty educated persons of various ages and both sexes', we endeavour to give the information (the birth year, education level and occupation of the guests) in the footnotes. The purposes to provide this information are, first, to examine Darwin's statement about the various backgrounds of the viewers and, second, to see whether such variety can make any difference in the experimental results<sup>104</sup>. Based on the footnoted biographies and because all the interviews took place throughout the year of 1868, the ages of the guests in 1868 are then worked out. The

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<sup>103</sup> With respect to the authorship, Snyder (2010) recommends Darwin's wife and lifetime assistant, Emma. The reader who would like to question this can make a comparison between this handwriting and Emma's proved autography. An online report, 'Emotion Experiment', in Darwin Correspondence Project (DCP) even reckons possible contribution from one or some of the guests, but without identifying a name. My discussion here, however, will not go that far because the problem does not affect our understanding on the texts of the three sheets. Our key focuses in this chapter are, rather, how the texts were derived from Darwin's recognition experiments, and whether and how they were published as testimonies in the *Expression of Emotion*.

<sup>104</sup> In Part II we will further see that, after the general introduction in the beginning, Darwin is unwilling to give detailed information of the viewers in the texts. His stress is, rather, upon whether the photographed expressions had been correctly recognized by most of the viewers.

key information, age and gender, will be provided inside the table after each name. F/M stands for Female/Male.

Table 3.2 The guests' names on the three sheets

Tables	Names on the first row of each table from left to right							
Table (b)	Hensleigh Wedgwood <sup>105</sup> (M 65) and his two sons <sup>106</sup> (M 26; M 30)	Edward Blyth <sup>107</sup> (M 58),	Henry Trimen <sup>108</sup> (M 25)	Horace <sup>109</sup> (M 17)	Mrs. Lushington <sup>110</sup> (F 34)	Mr. Lushington <sup>111</sup> (M 36)	Farrar <sup>112</sup> (M 49)	Henslow <sup>113</sup> (M 33)
Table (c)	Strickland <sup>114</sup> (M 29)	George <sup>115</sup> (M 23)	Huxley <sup>116</sup> (M 43)	R. Ruck <sup>117</sup> (M 17)	Clement Wedgwood <sup>118</sup> (M 28)	Miss S. Horner <sup>119</sup> (F 52)	Miss Pertz <sup>120</sup> (F 9)	Mrs Pertz <sup>121</sup> (F 50)

<sup>105</sup> Darwin and Emma's cousin (1803-1891).

<sup>106</sup> Alfred Allen Wedgwood (1842-1892) and Ernest Hensleigh Wedgwood (1838-1898).

<sup>107</sup> Zoologist and druggist (1810-1873).

<sup>108</sup> Botanist (1843-1896).

<sup>109</sup> Horace Darwin (1851-1928), CD's son, civil engineer, BA at Cambridge University (Trinity College), 1874.

<sup>110</sup> Beatrice Anne Lushington (1834/5-1914). Married Godfrey Lushington in 1865.

<sup>111</sup> Godfrey Lushington (1832-1907), civil servant, BA at Oxford University (Balliol College), 1854

<sup>112</sup> Thomas Henry Farrer (1819-1899), civil servant, BA at Oxford University (Balliol College), 1840.

<sup>113</sup> George Henslow (1835-1925), clergyman, teacher, and botanist, BA at Cambridge University (Christ's College), 1858.

<sup>114</sup> Sefton West Strickland (1839-1910), conveyancer and equity draftsman, BA at Cambridge University (Christ's College), 1862. Friend of Darwin's son, William Erasmus.

<sup>115</sup> George Howard Darwin (1845-1912), CD's son, mathematician, BA at Cambridge University (Trinity College), 1868.

<sup>116</sup> Thomas Henry Huxley (1825-1895), zoologist, assistant-surgeon on *HMS Rattlesnake*.

<sup>117</sup> Richard Matthews Ruck (1851-1935), Army officer. Friend of CD's son, Francis and the brother of Francis's first wife, Amy Richenda Ruck.

<sup>118</sup> Clement Francis Wedgwood (1840-89), businessman in the Wedgwood pottery firm, the second son of Frances and Francis Wedgwood. Frances was the sister of Emma Darwin.

<sup>119</sup> Anne Susan Horner (1816-1900), author and translator. Daughter of Leonard Horner. Author of works on Italian history, literature, and other subjects. Lived in Florence from soon after 1864 until 1890

<sup>120</sup> Probably Dorothea Frances Pertz (1859-1939), the youngest daughter of Mrs. Pertz, botanist. She recalled that in childhood she had visited Darwin in Down.

<sup>121</sup> Leonora Horner (1818-1908), daughter of Leonard Horner and sister of Susan Horner, translator. Married noted historian Georg Heinrich Pertz (1795-1876) in 1853.

Table (a)	Amy Crofton <sup>122</sup> (F 33)	Lucy Wedgwood <sup>123</sup> (F 22)	Sophia Wedgwood <sup>124</sup>	Crotch <sup>125</sup> (M 26)	Dr Gray <sup>126</sup> (M 58)	Mrs Gray <sup>127</sup> (F 47)	Mrs Hooker <sup>128</sup> (F 43)	Mr. Woolner <sup>129</sup> (M 43)
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The footnoted information tells us that the majority of the guests were members of the Darwin-Wedgwood family<sup>130</sup>, including Darwin and Emma's two sons, George and Horace, and other relatives. The other guests were mostly Darwin's friends with naturalist interest or scientific background. Their ages covered from 10s (three), 20s (seven), 30s (five), 40s (five), 50s (four) to 60s (one). Except the youngest and oldest, the numbers of people in the middle four generations are almost even. The 25 viewers, moreover, can be divided into eight females and 17 males. The various ages and both sexes seem to have obeyed the rules in modern science. However, due to the small number of the whole samples, such diverse backgrounds, like the age, gender and occupation, of the viewers as emphasized by Darwin in the book, did not make a difference in the results. For example, the youngest viewer Miss. Pertz at the age of nine did not use different vocabulary from the adults. Only when there are large enough samples in each generation or gender can we make meaningful comparison of the results. Given that, we will not provide detailed information of the viewers to each emotion by incorporating the information in Table 3.1 with that in Table 3.2. By now we have inspected each part of Darwin's introduction to this method, including the (change of) question asked; the age, gender and education level of the viewers. Through historical research into Darwin's and Emma's archives, we also make out the sequence of the three sheets and the dates of the interviews. Now we can turn to inquire into Darwin's aim with these experiments or, namely, the function of them in the book, which is the consistent theme in our discussion of Darwin's three methods.

#### 1.4 Understanding Darwin's aim

<sup>122</sup> Amy Wedgwood (1835–1910), daughter of Francis and Frances Wedgwood. Emma Darwin's niece. Amy is called Amy Crofton only in a letter from Emma to her aunt Fanny Allen, Down Thursday May 1867 (Litchfield 2010:213).

<sup>123</sup> Lucy Caroline Wedgwood (1846–1919), daughter of Caroline Wedgwood and Josiah Wedgwood III. CD's niece. Married Matthew James Harrison in 1874.

<sup>124</sup> Katherine Elizabeth Sophy Wedgwood (1842–1911), CD's niece.

<sup>125</sup> Probably George Robert Crotch (1842–1874), entomologist, BA at Cambridge University (St John's), 1864; MA, 1867. Second assistant librarian at Cambridge University Library, 1867–1871.

<sup>126</sup> Asa Gray (1810–1888), American botanist, Fisher Professor of natural history at Harvard University.

<sup>127</sup> Jane Loring Gray (1821–1909), edited the *Letters of Asa Gray* (1893).

<sup>128</sup> Frances Harriet Henslow (1825–1874), daughter of Darwin's mentor, John Stevens Henslow, sister of George Henslow in Table (b). Married Joseph Hooker in 1851,

<sup>129</sup> Thomas Woolner (1825–1892), sculptor and poet.

<sup>130</sup> The biographical information in Table 3.2 serves as the sidelights not only for Darwin and Emma's family life in front of the guests but also for the guests' childhood or adolescence who became influential scientists later, such as Miss. Pertz, who grew up to be a botanist and the first female Fellow of the Linnean Society; see Arber (1939).

Snyder's (2010) alignment of the three tables as a, b and c that follows the original back mark has been overturned. Apart from that, the information we read from the three sheets of paper may prove his another argument questionable. Snyder supposes that, 'As can be seen by Darwin's pencil markings to the right side of the first page of the three data tables (Figure 3.1), he had started to tabulate the results to determine which few of these 11 plates were associated with the most agreement — with respect to the identification of the emotion being displayed — by his 24 successive guests to Down House' (Snyder 2010:162). I think Snyder here may have over-interpreted the mark on the blank side of Table (a) because the place he points to only enumerates four types of answers to one emotion. If, as Snyder suggests, Darwin aimed to determine which of the 11 plates received the most agreement, then the positive rate (agreement) of the answers to OTHER emotions should also be listed there or on a separate sheet. Snyder's possible misunderstanding of that mark derives from a basic belief of his article, as written in the exact beginning, the *Abstract*, that,

'In the late 1860s and early 1870s, Darwin had corresponded with the French physician and physiologist, G. B. A. Duchenne, regarding Duchenne's experimental manipulation of human facial expression of emotion. ... Darwin had doubted Duchenne's view that there were individual muscle groups that mediate the expression of dozens of separable emotions, and he wondered whether there might instead be a fewer set of core emotions that are expressed with great stability world-wide and across cultures. Prompted by his doubts regarding the veracity of Duchenne's model, Darwin conducted what may have been the first-ever single-blind study of the recognition of human facial expression of emotion' (p. 158)

In Snyder's opinion, Darwin applied the 11 experiments to test the veracity of the emotions displayed in Duchenne's plates and to reduce them to basic emotions that are stable world-wide. This interpretation nonetheless conflicts with several facts. First, as the preceding chapter has found out from Darwin's use of the questionnaire, there was not a notion or focus of the author on basic emotion. Second, the time of the recognition experiments, 1868, was later than 1867 when the questionnaires had all been sent out. Third, in the book, the 11 experiments are almost entirely presented in the text without 'reduction', and more significantly, the discussions around them have nothing to do with cross-cultural concern. Snyder's assumption of Darwin's aim is very similar to those scholars overstressing Charles Bell's influence, as criticized in Chapter 1. As a naturalist rather than a scientific critic, none of Darwin's main books was primarily devoted to refuting a particular idea of other scientists but to sustain an evolutionary doctrine to account for common features and behaviours of organisms in



general. In that process, sometimes he had to contend with some existing and dominating anti-evolutionary beliefs, such as Charles Bells' creationist view on emotion. However, those conflicts were just spin-offs from his central pursuit. With the *Expression of Emotions*, the piece of work on recognizing Duchenne's plates should not be isolated from the author's grand scheme to collect evidence for understanding some main problems in the book. Inasmuch as the book does not summarize the experiments as a whole or announce the author's aim clearly, it is not surprising that some scholars, like Snyder (2010), may bear misconceptions and even link them with cross-cultural comparisons, which can never be achieved by the none but European guests. In contrast, I would like to suggest that Darwin's research on Duchenne's plates centred on his interest in facial muscular problems all the time. This is revealed by, first, Darwin's annotations to Duchenne's 1862 book, and second, his discussion on the experimental results with other scholars, and finally the presentation of the tests in the *Expression of Expression*. The following sections will follow this routine to manifest the purpose of Darwin in his studies of Duchenne's 1862 book and plates.

## **2 Darwin's annotations to the *Mechanism* and discussion of it with James Crichton-Browne**

### *2.1 Annotations to the Mechanism (1862)*

The photographs made use by Darwin in the recognition experiments are provided in Duchenne's *The Mechanism of Human Physiognomy* (1862) (referred to as *Mechanism* hereafter). Darwin's annotations to the book (that has two parts) are listed below, sequenced by page numbers.

#### Part I

p. 22 'only one muscle used'

p. 31 'showing absurdly how all examples created'

p. 38 'All muscles continuous — says it is an illusion ... describes facial muscles continuous'<sup>131</sup>

p. 40 underline "petit zygomatique" (zygomaticus)

p. 43 'in Laughter upper palpebrae (palpebral), also; but these disused in joy because associated with intense & painful attention.'

p. 47 'eyes'

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<sup>131</sup> On the End Slip Darwin further remarks that, 'Seem quite aware of many sources of error — Huxley says discovered muscles'.

## Part II

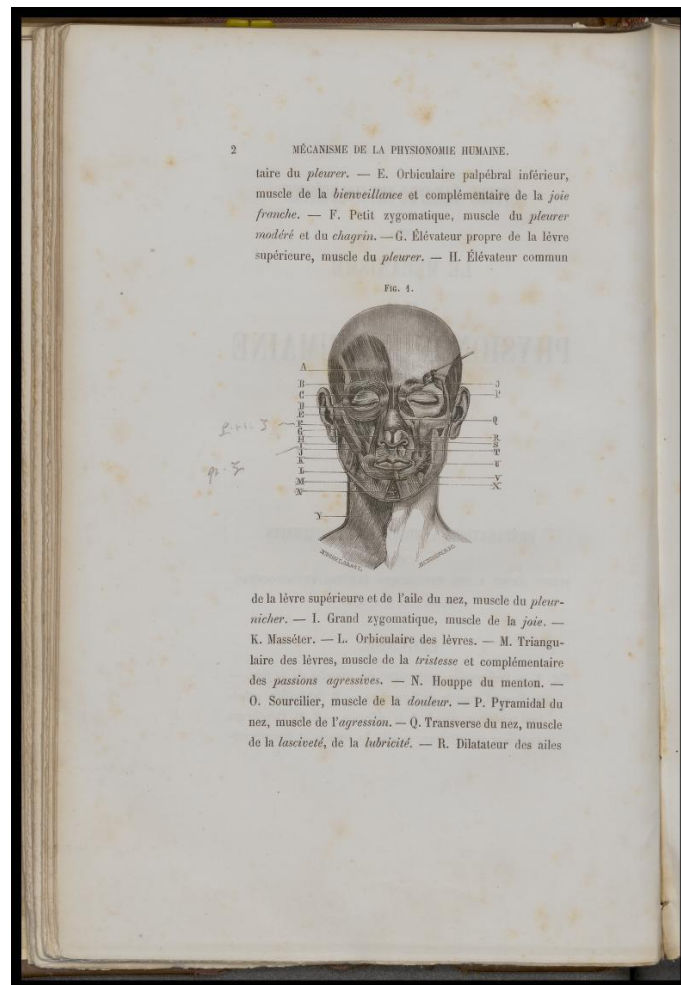


Fig. 3.4 Page 2 in Part II of the *Mechanism* (Duchenne 1862; CUL)

p. 2 'woodcut of face'

p. 8 'eyebrows — move least under will'

p. 26 'by mere corrugator'

p. 29 'separation of pyramidal & frontal'

p. 32 'The contraction of the orbicularis by themselves do not give look of Hardness.'

p. 43 'Judging by his experiments, the movement does seem entirely due to sourcilier (eyebrow) ... antagonism of sourcilier & frontal ... which I suppose opposes sourcilier'

p. 53 'antagonism of sourcilier & frontal'

p. 62 'See Large Plates'

p. 75 'triangular of lip'

p. 176 'The eyes bng open to see'

p. 180 annotation in brown ink not in Darwin's hand: 'on the pyramidal bringing down the brows'

p. 184 'in a false laugh the zygomatic is alone contracted' (CUL)

We can see that all of Darwin's annotations concern muscular problems. And, when Darwin was reading the *Mechanism* with numerous photographs, only the anatomical face in Fig. 3.4<sup>132</sup> above was due to be reproduced in the *Expression of Emotions*. It shows that Darwin's initial focus on the book was seeking resolutions for the muscular problems in the expressive movements of human faces. When Darwin later asked his guests to recognize Duchenne's plates, did he turn to consider other problems?

## 2.2 Exchanging ideas with Crichton-Browne

'Your remark on the sternocleidomastoid muscle leads me to ask for information on one point, about which I have long been extremely curious. Duchenne (whose great work on expression perhaps you know) gives photographs of persons with the platysma myoides contracted by galvanism, which wrinkles the skin of the neck transversely, and draws a very little downwards the cheeks near the corners of the mouth. These photographs when tested by showing them to many persons without any explanation and asking what they meant, seem well to exhibit extreme fear; but whether the contraction of the platysma plays so important a part as Duchenne thinks, I wish to ascertain. Would you kindly observe patients suffering under extreme fear, with widely distended eyes, open mouth and erect hair, whether you can observe the contraction of this muscle? (Darwin 1869b).

The above text was written in Darwin's letter to Crichton-Browne on 22 May 1869, six months after his final recognition experiment with Mr. Woolner. Duchenne's plate was cited here contributing to the discussion of the 'platysma myoides', and the aim of the recognition experiment on it was stated as to test if the photographed expression well 'exhibit extreme fear'. Though a satisfactory result<sup>133</sup> was received, Darwin still wished to ascertain 'whether the contraction of the platysma plays so important a part as Duchenne thinks'. Their subsequent exchanges on Duchenne's plates in the following two years concentrate on either the 'platysma' or the 'grief muscles'<sup>134</sup>. From both Darwin's annotations to Duchenne's book and his later discussions with Crichton-Browne we can see that, Darwin had been interested in facial muscles'

<sup>132</sup> Similarly, the facial musculature diagrams in Charles Bell's *The Anatomy and Philosophy of Expression* (1844) were too marked by Darwin as 'woodcut of face'.

<sup>133</sup> It was No. 3 Fright on the three sheets, which had been successfully recognized by most viewers. Part II will present Darwin's discussions of the eleven experiments in the *Expression of Emotions*.

<sup>134</sup> More information on Darwin's correspondence with Crichton-Browne has already been written in Pearn (2010); Browne (1985); Crow (1995) and Gilman (1979).

movements during emotions throughout the time, and the recognition experiments were applied to test whether the stimulated muscles were the proper ones active in natural emotions. We now would like to check this argument with Darwin's discussions of the eleven experiments in the *Expression of Emotions*.

## **Part II: Relating Darwin's recognition data to their use in the Expression of Emotions**

Despite offering the three figures of Darwin's manuscript, Snyder's (2010) initial aim 'to better understand how his (Darwin's) "experiment" guided his editorial decisions' is only realized in one of the seven experiments as he counts (p. 162). After searching the book, I find in all there are ten tests spreading in the chapters on human emotions from Chapter VI onwards. They are extracted from the texts and examined here in comparison with the manuscript to see whether Darwin had correctly presented the differential information, such as the change of question and the numbers of guests. They are divided into three groups: two experiment pairs, two tests on grief and four experiments on fright, introduced in Section 3, 4 and 5 respectively. When the introduction unfolds from Section 3 to 5, we can see, first, a consistent focus of Darwin on muscular problems and, second, the change of strategies in his dealing with more complex emotions in Section 4 and 5.

### **3 Experiment pairs on true or false expressions**

#### *3.1 Experiment 7 and 6 on the smiling and crying muscles*

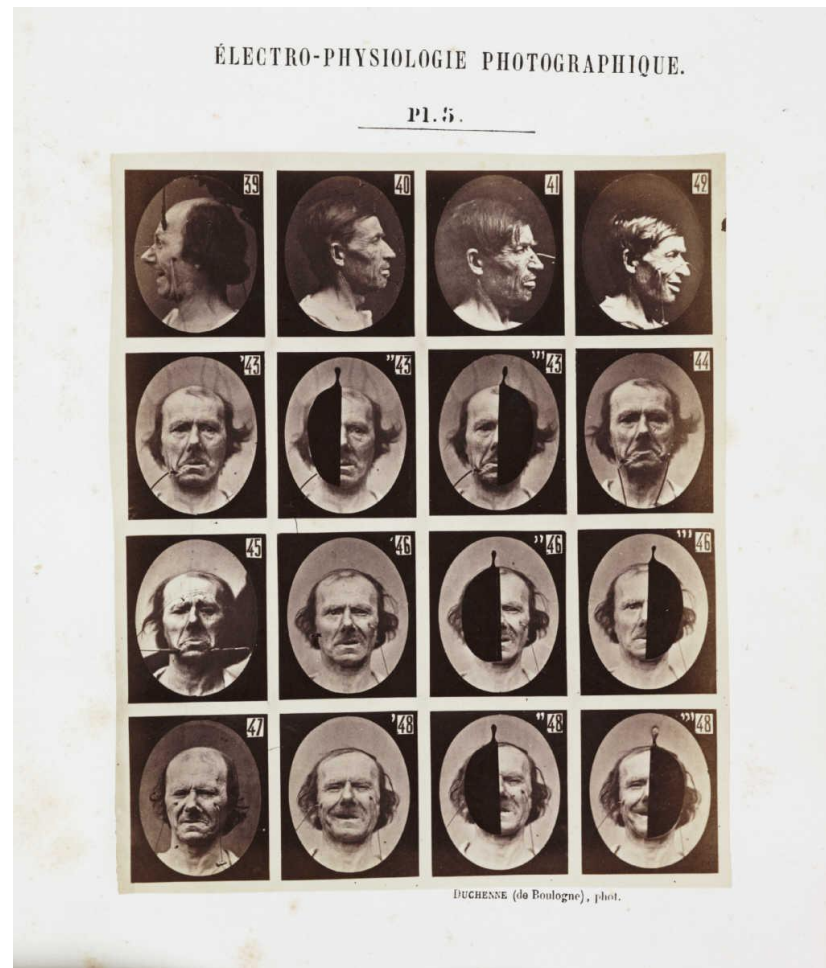


Fig. 3.5 Synoptic Plate 5 in Duchenne's Album (Duchenne 1862; NMM<sup>135</sup>)

The first experiments mentioned in the *Expression of Emotions* are No. 7 and No. 6 together in one footnote to the first chapter on human emotion, Chapter VI *Special Expressions of Man: Suffering and Weeping*. Before the experiments Darwin writes that, 'Although Dr. Duchenne has so carefully studied the contraction of the different MUSCLES during the act of crying, and the furrows on the face thus produced, there seems to be something incomplete in his account; but what this is I cannot say.' (Darwin 1872: 150). He then introduces Photo 48 in Duchenne's Album (see the three at the bottom of Fig. 3.5 above). The photograph is showing an asymmetric face that its left half is made smiling; whilst the right half is made to begin crying (p. 150). According to Duchenne, the muscles stimulated on each half act when these emotions are naturally expressed, called smiling and crying muscles. Darwin writes that, this photograph was presented to twenty-one viewers, and nineteen of them successfully recognized the smiling half; in contrast, only six of the viewers recognized the crying half, while the other 15 persons gave totally unrelated answers, such as 'fun', 'satisfaction' and 'cunning' (p. 150). Darwin then concludes from the result on the

<sup>135</sup> National Media Museum.

‘crying half’ that ‘we may infer from this that there is something wrong in the expression’, indicating that the ‘crying muscles’ identified and stimulated by Duchenne are inconclusive in their relation to natural crying. On Darwin’s manuscript, the numbers of correct answers, ‘19’ and ‘6’, to No. 7 are marked on the last column in Table (a) by a blue pencil. This information is properly introduced in the *Expression of Emotion*. For the overall number of viewers, the first four guests in Table (b) did not participate in recognizing this emotion, so the number Darwin gives in the book, 21, is right by 25-4. It shows that Darwin was clear in mind that there were 25 effective viewers at most. Notwithstanding that, in the successive experiments, sometimes the information is not accurately declared.

Experiment 6: a modification to No. 7



Fig. 3.6 Synoptic Plate 6 in Duchenne’s Album (Duchenne 1862; NMM)

Unsatisfied with the result obtained in No. 7 on the crying half, Darwin cites the sixth

experiment on the manuscript (Photo 49 from Duchenne's plates, see the middle one of the three '49' on the top row of Fig. 3.6 above<sup>136</sup>). To produce the expression, apart from galvanizing the same crying muscles as in Photo 48, the eyebrow on the same side was also rendered oblique (Darwin 1872: 151). The expression induced by such means is characteristic of misery to Duchenne. Darwin writes that, the photograph was presented to twenty-three persons, and fourteen of them recognized the expression as 'sorrow', 'grief' and 'distress', which are all taken as correct answers by Darwin. Comparing with the row of No. 6 '1/2 crying' on Darwin's sheets and my calculation in Table 3.1 above, Darwin here mistakenly says 23 viewers which are in fact 25. It is probably because when Darwin moved his eyes from the row of No. 7 to No. 6, the two blank squares in Table (b) were wrongly taken as two viewers instead of four. He then got 23 by 21 (No. 7) plus 2. Notwithstanding the mistake, the number of right answers are correctly presented because they were counted separately in each row.

In sum, following the complaint to Duchenne's 'incomplete account' of the different MUSCLES, Darwin in the footnote introduces Experiment 7 and 6 in succession with an emphasis on the improvement of results on the crying half. Given that Photo 49 'was recognized by a greater proportional number of persons' (p. 151), the expression is then deemed as characteristic of misery.

### *3.2 Experiment 0 and 1 on false and natural smile*

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<sup>136</sup> In Duchenne's plates, one photo number sometimes refers to three images including a full face and two half masked ones. In narrating these experiments, Darwin does not indicate whether the face was masked by himself or he used the masked face in Duchenne's set.

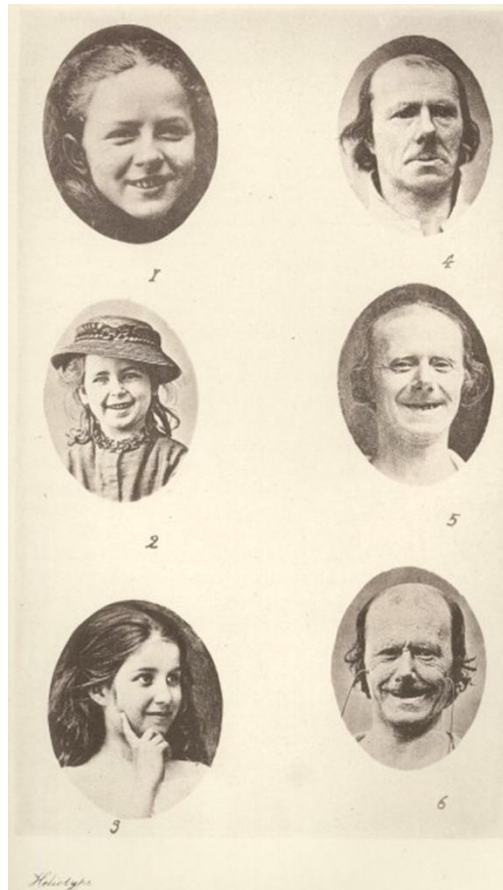


Fig. 3.7 Plate III in the *Expression of Emotions* (Darwin 1872: 202)

The next experiment pairs emerge in Chapter VIII on joy and smiling. On page 202, Duchenne's photographs are for the first time reprinted in the *Expression of Emotions*. As Fig. 3.7 above shows, the three images at the right side are made with the same old man, numbered here as Image<sup>137</sup> 3.7.4-3.7.6<sup>138</sup>. The top Image 3.7.4 was taken in the old man's 'usual passive condition'. The middle Image 3.7.5 was shot when he was naturally smiling. The last Image 3.7.6 was given by its producer as an example of unnatural or false smile. It is produced by galvanizing the 'great zygomatic muscles' of the subject, resulting in the strong retraction of the corners of his mouth (p. 203). If we look back to Darwin's annotations in Section 2.1 above, we can find a relevant mark on page 184 that 'in a false laugh the zygomatic is alone contracted' (Duchenne 1862: 184). When presented to a group of viewers, the middle Image 3.7.5 was 'instantly recognised by every one' as the true expression of natural smile. With the last Image 3.7.6, three of twenty-four viewers 'could not in the least tell what it meant, whilst the others, though they perceived that the expression was of the nature of a smile, answered in such words as "a wicked joke", "trying to laugh", "grinning

<sup>137</sup> In this chapter, the pictures in Darwin's book are numbered as Image x, in Duchenne's plates are named as Photo x, in my texts are called as Fig. x.

<sup>138</sup> They are Photo 2, 32 and 31 in Duchenne's plates.



laughter", "half-amazed laughter," &c.' (p. 203). A conclusion is thus drawn from the result on Image 3.7.6 'that the expression is not natural is clear' (p. 203).

The experiment on Image 3.7.5 does not exist in Darwin's manuscript, numbered here as Experiment 0. Without exact numbers of viewers and answers, the satisfactory result that it was 'instantly recognised by every one' should be Darwin's conjecture. The experiment on Image 3.7.6 points no doubt to No. 1 Laughter on the manuscript. Though the overall number of viewers, 24, is correct, Darwin has revised the positive rate of answers to fit his argument. In fact, there are only seven negative replies: three complete negations, a "wicked joke" (Column 4 of Table (c)), a "trying to laugh" (Column 7 of Table (b)), a "grinning laughter" (Column 8 of Table (a)) and a "half-amazed laughter" (Column 7 of Table (c)). We can see from the three tables that, there are just three blue crosses marked against those entirely negative answers. It shows that at first the other four examples given in " " were counted as positive. When writing that passage later, Darwin looks for more negative data and highlights them in the beginning, while the preponderance of the 17/24 correct answers is thus downplayed. With these efforts, Darwin attempts to affirm the falseness of the expression in Image 3.7.6 and further challenge Duchenne's explanation of the muscular mechanism of smiling. The discussion immediately following the experiments evidently shows Darwin's focus on the muscular problems.

'Dr. Duchenne attributes the falseness of the expression altogether to the orbicular muscles of the lower eyelids not being sufficiently contracted; for he justly lays great stress on their contraction in the expression of joy. No doubt there is much truth in this view, but not, as it appears to me, the whole truth. The contraction of the lower orbiculars is always accompanied, as we have seen, by the drawing up of the upper lip. Had the upper lip, in fig. 6, been thus acted on to a slight extent, its curvature would have been less rigid, the naso-labial furrow would have been slightly different, and the whole expression would, as I believe, have been more natural, independently of the more conspicuous effect from the stronger contraction of the lower eyelids. The corrugator muscle, moreover, in fig. 6, is too much contracted, causing a frown; and this muscle never acts under the influence of joy except during strongly pronounced or violent laughter.' (p. 204-205)

Duchenne has realized the falseness of the expression and attributes the problem to the insufficient contraction of the orbicular muscles in the lower eyelids. Darwin accepts Duchenne's belief to some extent while adding two amendments. First, Darwin suggests the overlooking of the drawing up of the upper lip, which is always accompanied with the contraction of the lower orbiculars in (a) natural smile (p. 204).

Second, the corrugator muscle in Image 3.7.6 is contracted too much, which should never act in a moderate smile (p. 204). These amendments to Duchenne's explanation stem from Darwin's own observations and experiences. By modifying Duchenne's supposition, Darwin intends to bring up what muscles indeed act in a natural expression of joy.

Before we start to introduce the following tests presented in the *Expression of Emotions*, we should better understand the above experiments in the pairs: No. 7 & 6 and No. 0 & 1. Although direct conclusion is not drawn from any two of them, we can easily perceive that there are comparisons between true and false expression in each of the pairs. By introducing these experiments at a time, Darwin aims to find from Duchenne's plates a galvanizing-stimulated expression that is more approximate to a naturally expressed one. If the expression is successfully recognized by most of the viewers, then the muscles stimulated can be regarded as acting in the relevant emotion. Hence No. 6 is a modification to No. 7 in order to receive a better result on the crying half. Consequently, the muscles stimulated in the photo of No. 6 have a larger chance to act in that emotion. While, in the successive chapters of the *Expression of Emotions* concerning more complex human emotions, there is no such comparison between natural and false expressions. The other experiments are, rather, primarily providing basic information on the muscles motivated or just illustrating the expressions.

#### **4 Experiment 9 and 11 on grief and moroseness, no comparison but amended descriptions**

##### *4.1 Experiment 9 on grief*



Fig. 3.8 Plate II in the *Expression of Emotions* (p. 180; NMM)

The first single experiment is mentioned on page 182 in Chapter VII about grief. It is No. 9 Deep grief on the manuscript and refers to Photo 24 in Duchenne's Album. The photograph is reproduced as the second image in Plate II of the *Expression of Emotions* displaying the expression of grief in various ages of human, see Fig. 3.8 above. The actor is introduced by Duchenne as an anatomist who was capable to move his eyebrows to an unusual angle. His name was identifiable elsewhere as Jules Talrich, an anatomical modeller (DCP). In all the eleven experiments on the manuscript, only this one No. 9 and the one below, No. 11, used the photographs of the young man, while the others were about the old man<sup>139</sup>. Talrich's unusual ability to display an oblique eyebrow is the reason why Photo 24 is reduplicated in the book. Darwin believes that, the oblique eyebrow adds to the expression of grief, as can be evidenced by the experiment result on the photograph. 'That the expression is true, may be inferred from the fact that out of fifteen persons, to whom the original photograph was shown, without any clue to what was intended being given them, fourteen immediately answered, "despairing sorrow," "suffering endurance," "melancholy," and so forth. (p. 182). Since No. 9 was only consulted in Table (c) and (a) with the final version of question, *What*, asked, Darwin's introduction to the question is right this time. The only negative answer not listed by Darwin should be 'Scorn' in Column 2 of Table (a). In the footnote, Darwin further challenges Duchenne's analysis of the specific muscular movements in the expression:

<sup>139</sup> The old man's name was unknown.

‘Dr. Duchenne ... believes that it is the corrugator, called by him the *sourcilier*, which raises the inner corner of the eyebrows and is antagonistic to the upper and inner part of the orbicular muscle, as well as to the *pyramidalis nasi* (see *Mécanisme de la Phys. Humaine*, 1862, folio, art. v., text and figures 19 to 29: octavo edit. 1862, p. 43 text). He admits, however, that the corrugator draws together the eyebrows, causing vertical furrows above the base of the nose, or a frown. He further believes that towards the outer two-thirds of the eyebrow the corrugator acts in conjunction with the upper orbicular muscle: both here standing in antagonism to the frontal muscle. I am unable to understand, judging from Henle's drawings, how the corrugator can act in the manner described by Duchenne. See, also, on this subject, Prof. Donders' remarks in the 'Archives of Medicine,' 1870. Mr. J. Wood, who is so well known for his careful study of the muscles of the human frame, informs me that he believes the account which I have given of the action of the corrugator to be correct. But this is not a point of any importance with respect to the expression which is caused by the obliquity of the eyebrows, nor of much importance to the theory of its origin.’ (p. 181).

The above text is in accordance with Darwin annotation to the *Mechanism* in Section 2.1. His mark on page 43 questions Duchenne's idea that, ‘Judging by his experiments, the movement does seem entirely due to *sourcilier* (eyebrow) ... antagonism of *sourcilier* & frontal ... which I suppose opposes *sourcilier*’ (CUL). In contrast to the amendments he has made in discussing the experiment pairs above, Darwin this time admits that he is unable to understand Duchenne's description from his own observations on ‘Henle's drawings’ (Darwin 1872: 181). Due to the lack of training on anatomy, throughout the book Darwin has to follow ‘what seems to be the universal opinion of all the anatomists’. Nonetheless, on this expression, the remarks from other physiologists, namely Donders and Mr. J. Wood, are insufficient to overturn Duchenne's findings, though doubted by Darwin (p. 181).

#### 4.2 Experiment 11 on moroseness

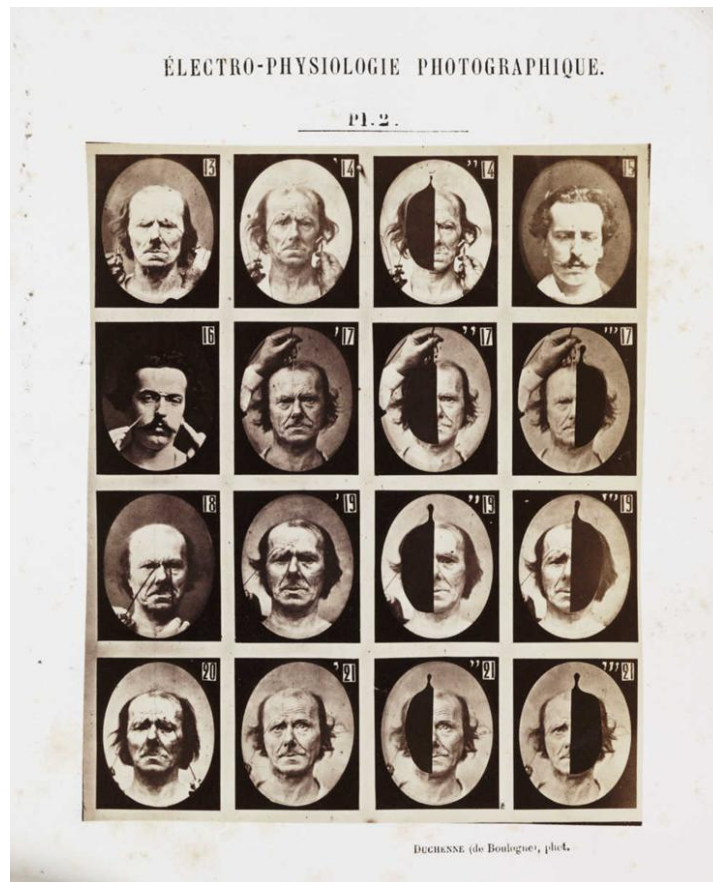


Fig. 3.9 Synoptic Plate 2 in Duchenne's Album (Duchenne 1862; NMM)

The sixth experiment exists in Chapter IX concerning the emotion 'moroseness'. It is No. 11 Hardness on the manuscript, referring to Photo 16 in Duchenne's Album, see Fig. 3.9 above. With respect to this expression, Darwin adopts Duchenne's statement that the contraction of the pyramidal muscles of the nose plays a role. In addition to this, Darwin adds that a 'frowning brow' too is necessary in the expression of moroseness. He then shows eleven viewers of the photograph made by Duchenne in which the pyramidal muscles of the nose only were galvanized to contract (Darwin 1872: 231). The result supports the falseness of the expression that ten of the eleven viewers could not at least tell what the intention of the expression was; only one female answered 'surly reserve' (p. 231). Darwin mentions that the viewers include some artists<sup>140</sup>. Similar to his report on the result of Experiment 1 (see Section 3.2 above), Darwin here again exaggerates the proportion of negative answers. In fact, five of the eleven visitors had pronounced the 'intention of the expression'. They are 'Surly reserve' by Miss S. Horner, 'Decided character' by Miss Pertz and 'Thought' by Mrs Pertz in Table (c); 'Contempt or reproof' and 'Cynical pride' in Table (a). According to Darwin, only the 'surly reserve' is near to 'hardness' or 'moroseness'. However, Miss S. Horner's answer did not differentiate too much from her two

<sup>140</sup> It is the first time that the occupational information of the viewers is provided in the book.

accompanies’: ‘decided character’ and ‘thought’. By exaggerating the failure of the viewers, Darwin aims to affirm the falseness of the expression. He then argues that ‘my imagination added, as I believe, what was necessary, namely, a frowning brow; and consequently the expression appeared to me true and extremely morose’ (p. 231-232). This quotation tells us that this time Darwin adds from his IMAGINATION ‘a frowning brow’ to form a natural expression of moroseness. In contrast, in discussing the experiment pairs (No. 7 & 6 and No. 0 & 1) in Section 3, the modifications to Duchenne’s unnatural photographs are based on his own OBSERVATIONS. Compared to the basic emotions, smiling and crying, in the first two experiments, Darwin is unable to provide observational evidence for the more complex and subtle emotion, moroseness or hardness. Furthermore, Darwin’s annotations to the *Mechanism* indicate that the ‘frowning brow’ is not from his imagination but learned from Duchenne. Among those listed in Section 2.1, we can find two notes about the pyramidal muscles in relation to the face in Photo 16. They are on page 29 ‘separation of pyramidal & frontal’ and on page 180 ‘on the pyramidal bringing down the brows’. The second note is the root of Darwin’s amendment to Photo 16 to add a ‘frowning brow’. The result of Experiment 11 is thus discussed to bring out this idea. In the following experiments, with the increase of complexity in the muscular movements, such imaginary modifications too disappears. Duchenne’s practices are not criticized or altered there but seen as the sources of detailed descriptions of the expressions.

## **5 Experiment 2, 3, 10 and 5: from surprise to horror**

### *5.1 Experiment 2 on surprise*



Fig. 3.10 Synoptic Plate 6 in Duchenne's Album (Duchenne 1862; NMM)

The seventh experiment emerges on page 278-279, the exact beginning of Chapter XII *Surprise—Astonishment—Fear—Horror*. It is No. 2 Astonishment on the manuscript but used to discuss 'surprise' in publication, because Darwin in this chapter does not consider their difference at all. The photograph tested is Photo 56 in Duchenne's Album, see Fig. 3.10 above. Darwin writes that, 'This figure expresses surprise with much truth. I showed it to twenty-four persons without a word of explanation, and one alone did not at all understand what was intended. A second person answered terror, which is not far wrong; some of the others, however, added to the words surprise or astonishment, the epithets horrified, woeful, painful, or disgusted.' (Darwin 1872: 279). Darwin here is dishonest again in reporting the result that he selects the positive answers while hides the negative ones. The 'one alone' negation, 'no', is in Column 4 of Table (b) but the change of question is not declared. According to Darwin, the second worst reply is 'terror', which, however, is not the truth. The several epithets given by Darwin in the book, as quoted above, do not include some much more deviated answers. For example, in Table (b) there are 'Disgust & wonder' and 'Stupid



wonder', and Table (a) contains 'Pain & wonder', 'Stupid wonder', 'Sleepy' and 'Wonder'. We can see that, the 'sleepy' and 'pain' are certainly more negative than 'terror' to surprise, while the more often answered 'wonder' is not mentioned at all. By hiding these answers, Darwin strengthens the correctness of the result to confirm the accuracy of the stimulated expression that 'the eyes and mouth being widely open' is characteristic of surprise or astonishment.

### 5.2 Experiment 3 on fear

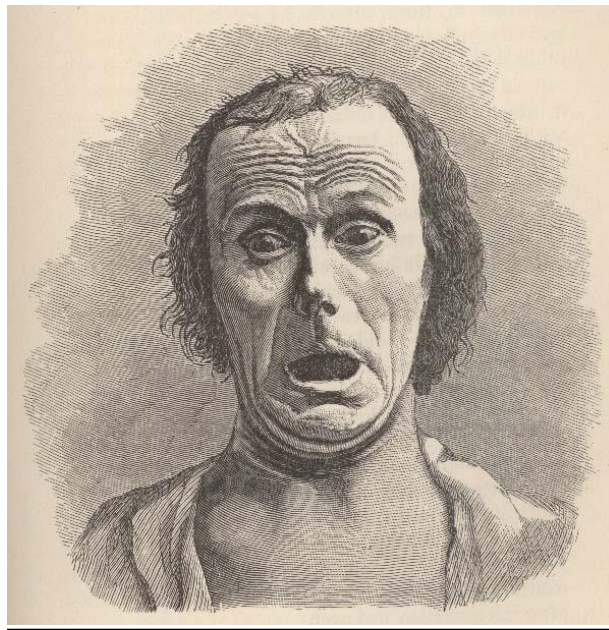


Fig. 3.11 Image 20 Terror in the *Expression of Emotions* (Darwin 1872: 299)

There are three other experiments in Chapter XII about the final emotions in its title: Fear and Horror. They are No. 3 Fright, No. 10 Fright, pain & torture and No. 5 Torture and agony on the manuscript. The three photographs are all reproduced in the book to display the gradual increase of the intensity of fear. No. 3 and 10 come out on page 299-300. Before them Darwin endorses Charles Bell's and Duchenne's findings on the contraction of the platysma myoides muscle (platysma muscle for short) in the expression of fear. Duchenne highlights the importance of the muscle and calls it the 'muscle of fright'. Photo 61 is then reproduced in the text with the experiment result on it. See Fig. 3.11 above, Duchenne produced this photograph by galvanizing the old man's platysma muscle to make it contracted. It is written that Darwin presented the image to twenty-four viewers. After separately asking them what expression was intended, twenty of them 'instantly answered, "intense fright" or "horror"; while three of them said "pain"; and one "extreme discomfort"' (p. 299-300). Firstly, Darwin makes a mistake again about the total number of the viewers, which is 25 in



fact. Secondly, Darwin is indicating that apart from ‘fright’ and ‘horror’<sup>141</sup>, the other answers are just four: three ‘pain’ and one ‘extreme discomfort’. Actually, there is a complete negation, ‘no’ in Table (b); besides, there is ‘Dismay’ in Table (c), ‘Scared’ and ‘Abject terror’ in Table (a). The negative answers account for 8/25 in all.

### 5.3 Experiment 10 on fright, the more intense level of fear



Fig. 3.12 Plate VII in the *Expression of Emotions* (p. 300)

Darwin then gives another image in the text, see the second one in Fig. 3.12 above. It is No. 10 Fright, pain & torture on the manuscript and Photo 64 in Duchenne’s Album. Aside from the same features in Photo 61 — the contracted platysma and the eyes and

<sup>141</sup> The positive answers should include ‘terror’, which indeed numbers the most.

mouth being opened, this time the eyebrows are also rendered oblique. Darwin agrees with the analysis of the expression given by Duchenne that, ‘the expression thus induced is very striking; the obliquity of the eyebrows adding the appearance of great mental distress.’ (p. 300). The experiment result on it is introduced like this, ‘The original was shown to fifteen persons; twelve answered terror or horror, and three agony or great suffering.’ (p. 300). See Table 3.1 above, this time the number of viewers is correct. If the unusual answer, ‘Seen a ghost’ in Table (a), was incorporated in ‘terror or horror’, Darwin this time would be basically truthful in reporting the types of result.

From the satisfactory results of these experiments, Darwin finally concludes that ‘the contraction of the platysma does add greatly to the expression of fear’. However, the results do not support his following argument that, ‘Nevertheless this muscle ought hardly to be called that of fright, for its contraction is certainly not a necessary concomitant of this state of mind’. On this problem Darwin had sought advice from Crichton-Browne earlier in 1869, see the letter quoted in Section 2.2 above. Browne’s answers contribute to Darwin’s supposition that,

‘A man may exhibit extreme terror in the plainest manner by death-like pallor, by drops of perspiration on his skin, and by utter prostration, with all the muscles of his body, including the platysma, completely relaxed. Although Dr. Browne has often seen this muscle quivering and contracting in ‘the insane’, he has not been able to connect its action with any emotional condition in them, though he carefully attended to patients suffering from great fear.’ (p. 300).

Considering the association between the contraction of the platysma muscle and the widely open mouth, Darwin in the study of fear proceeds to explore the cause of the platysma muscle being in act. The contraction of this muscle is ascribed by Darwin to respiratory movements that ‘this muscle sometimes contracts, perhaps for the sake of opening the mouth widely, when the breathing is rendered difficult by disease, and during the deep inspirations of crying-fits before an operation’ (p. 302). To arrive at this conclusion — the cause of specific muscular movements, Darwin has to borrow the ideas from physiologists, like Charles Bell, Duchenne and some other physicians, but without an insight or ability to examine these ideas. In the next chapter, we will see how this problem, respiratory movements during emotions, was later examined by Antoinette Feleký in a fledged school of psychology.

#### *5.4 Experiment 5 on horror and agony, the most intense level of fear*

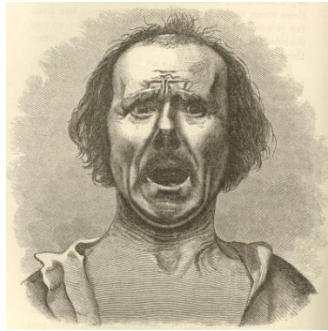


Fig. 3.13 Image 21 Horror and Agony in the *Expression of Emotions* (p. 306)

The final experiment in Chapter XII appears on page 306. It is No. 5 Torture and agony on the manuscript and Photo 65 in Duchenne's Album. The picture is reprinted, see Fig. 3.13 above, to demonstrate the most intense state of fear: horror. In describing this expression, Darwin cannot articulate its difference from the moderate forms of fear as illustrated in Fig. 3.11 and 3.12 above. He then has to cite Charles Bell that 'horror is full of energy, the body is in the utmost tension, not unnerved by fear' (Bell 1844: 169<sup>142</sup>; Darwin 1872: 305). On the relation between horror and fear, Darwin believes that 'fear is one of the elements' of horror. Based on the ideas of Charles Bell and Duchenne, Darwin summarizes the expression of horror in three parts: 1. the expression of fear — as demonstrated in the photographs of Experiment 3 and 10; 2. strong contraction of the brows — learned from Duchenne; 3. full of energy, see the quotation from Charles Bell above. In order to test the second part in Duchenne's operation, Darwin presented Photo 65 to twenty-three viewers of both sexes and various ages. Thirteen of them immediately answered horror, great pain, torture, or agony; three said extreme fright; six replied anger; one answered disgust (p. 305). Compared to our calculation in Table 3.1, the number of viewers should actually be 25. With the result, we can see that, there is a 'no' in Table (b), 10 pain or torture (7<sup>143</sup> in Table (b) + 2 in Table (c) + 1 in Table (a)), 6 fright, horror or terror (1 (b) + 2 (c) + 3 (a)), 6 rage or anger (0+3+3), 1 startled (b) and 1 disgust (b). In reporting the result, Darwin puts the fear and pain together as 13 + 3 to be the positive answers, while the 'no' and 'startled' are hidden. The overall number, 23, sounds suspicious that Darwin may intentionally discard these answers to make it by 25-2.

This photograph is suggested by Duchenne as showing extreme terror with agony. Darwin adopts this idea and names it as 'Horror and agony', see the caption of Fig. 3.12. Though combined with agony, it is the only image Darwin can find to

<sup>142</sup> Right on the same page is Charles Bell's discussion of the differences between fear and terror. Such distinctions, however, are not mentioned by Darwin at all, perhaps because Darwin lacked observational evidence or backup from other physiologists.

<sup>143</sup> Including 4 'yes'.

demonstrate the expression of horror, as can be revealed from his treatment to the result on it. From the outcome of Experiment 5, Darwin concludes that the first sixteen answers are ‘in accordance with Duchenne’s belief’; with respect to the six viewers who answered anger, he argues that they were ‘guided no doubt, by the strongly contracted brows, and overlooking the peculiarly opened mouth’ (p. 305-306). Finally he sums up like this, ‘on the whole, the evidence indicates that we have here a fairly good representation of horror and agony’ (p. 306). Darwin’s unconditional acceptance of Duchenne’s description of this image, without any amendments as in the experiment pairs (in Section 3) and Experiment 11 (in Section 4.2), exposes his lack of observational evidence and anatomical acquaintance with this problem. So, Experiment 5 on horror merely serves to illustrate the muscular movements in this expression.

## 6 Summary of Darwin’s eleven experiments

So far we have examined all the ten experiments we can find in the *Expression of Emotions*, with nine of them recorded on the manuscript, No. 1, 2, 3, 5, 6, 7, 9, 10, 11, and one from Darwin’s conjecture, No. 0. The ten experiments are summarized in Table 3.3 below. The first column is the numbers of emotions in Table (a) and (c). The second column is the names of emotions on the three sheets. The third column writes the emotive terms named in the *Expression of Emotions*. The last column is the muscles or facial features discussed with the experiments in the book.

Table 3.3 Emotive items on the manuscript and the emotions and muscles concerned in the *Expression of Emotions*

Number on the sheets	Name on the 1867 manuscript	Emotion concerned in the <i>Expression of Emotions</i> (1872)	Muscles and facial features discussed
1	Laughter	False smile	The orbicular muscles
2	Astonishment	Surprise	The eyes and mouth being widely open
3	Fright	Fear (basic level)	The platysma (myoides) muscle
5	Torture and agony	Horror and agony (most intense fear)	Contracted brows and the eyes and mouth being opened
6	1/2 crying	Crying	Crying muscles
7	1/2 laughing	Smiling and crying	Great zygomatic

	and 1/2 crying		muscles
9	Deep grief	Grief	The corrugator
10	Fright & pain & torture	Fright (more intense fear)	Contracted platysma, oblique eyebrows and the eyes and mouth being opened
11	Hardness	Moroseness	The pyramidal muscles of the nose

We can see that, from the manuscript to the *Expression of Emotions* the names of the emotions have mostly been changed, while such changes are not declared by Darwin at all. Seeing the last column, each of the ten experiments helps Darwin to better understand and illustrate muscular movements in the expression. It implies that in discussing the experimental results in the book, Darwin is more interested in the muscles stimulated and ascribed to by Duchenne than the expression itself in the photograph. This is also the reason why the correctness or falseness of the answers to some photographs are overstated by Darwin, e.g. in presenting the results of Experiment 2, 3, 5, 6 and 11, if excluding No. 0 — the results are totally based on conjecture with no experiment at all. By doing so, Darwin either confirms Duchenne's arguments on the role of specific muscles in inducing the expressions or aims to bring out modifications to Duchenne's suppositions.

With the above sections' going on, we also notice that in discussing the experiment pairs (No. 7 & 6 and 0 & 1) on the most basic expressions, smiling and crying, Darwin puts more effort on adjusting Duchenne's identification of muscles by drawing from his own observations (see Section 3). In contrast, in discussing the more complex expressions in Section 4 (No. 9 and 11), Darwin can only add amendments from his imaginations. Finally, with the four expressions from surprise to the most intense state of fear, horror, in Section 5 (No. 2, 3, 10 and 5), Darwin merely follows the popular ideas of some physiologists, though none of them is sufficient enough to overturn Duchenne's propositions. Besides, Duchenne's photographs, though displaying combined emotions, still have to be utilized to illustrate the last three expressions, due to the shortage of photographs.

Darwin's selection of the ten experiments to help write the book can be comprehended too in the two missing tests, No. 4 Despair & grief and No. 8 Suffering. Though referred to in the title of Chapter VI *Suffering and Weeping*, suffering is not seen by Darwin as an independent expression but the cause of weeping, so receives much less

attention and discussion. Analogous treatment is applied by Darwin to three emotive terms in the title of Chapter VII *Low Spirits, Anxiety, Grief, Dejection, Despair*: anxiety, dejection and despair. They are merely taken as similar words of grief to be mentioned together in the book like this, ‘in persons suffering from deep dejection OR anxiety’ (p. 180), ‘the expression of low spirits, grief OR dejection’ (p. 194), ‘more plainly than it did a state of dejection, OR rather one of grief’ (p. 197). So, No. 4 Suffering is discarded because No. 7 and 6 are exactly on crying. It is also no wonder that No. 4 Despair & grief is replaced by the more precise illustration of No. 9 on grief.

Apart from the findings on facial muscles and the copied photographs, Darwin had learned another method from Duchenne, which is easily overlooked by most readers — looking into the dialogues in Shakespeare’s plays. Duchenne in the final chapter of the *Mechanism*, Chapter 18 *Further aesthetic electrophysiological studies*, cites several passages from Shakespeare’s plays and claims that some of his plates have displayed or tested the famous dramatist’s description of emotions. Darwin too in the *Expression of Emotions* cites much Shakespeare and other dramatists, poets and novelists. However, as an unusual method in scientific research, Darwin’s use of the works of fiction is totally different from that of Duchenne’s. Part III below will introduce the most mysterious method of Darwin, Method 8 Literary approach.

### **Part III: The hidden Method 8 Literary approach**

#### **7 Darwin’s use of literary sources in the *Expression of Emotions***

##### *7.1 Locating the literature in the book*

Unlike our foregoing studies of Method 3 Recognition experiment and Method 5 Questionnaire comparing Darwin’s original data in the manuscript or in the correspondence with the published testimonies in the *Expression of Emotions*, we are here not taking the same method to analyse the eight method, Literary approach. We will, rather, only summarize the use of this method in the book to uncover the role it plays in Darwin’s argumentation. This job is done in Table 3.4 below. The first column is the page numbers in the 1872 edition, some marked with \* are supplemented in the 1890 version<sup>144</sup>. The second column is the length (number of lines) and types of the literature, e.g. a poem or a novel. The third column is the detailed references provided or hinted by Darwin, e.g. a novel’s title and its author. The fourth column notes the expression of emotion mentioned in the literature. The last column

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<sup>144</sup> The second edition of the book was edited by Darwin’s son, Francis, but the supplemented literature had already been written in a rough draft by Darwin.

counts the percentage of literary sources in Darwin's discussion of the expression. For example, '1/3, the only detailed one' in Row 2 means that, in all the three cases offered by Darwin to illustrate this expression, there is one from literature which is the only one with detailed description.

Table 3.4 The locations, length, types and utilities of the works of fiction in the *Expression of Emotions*

Page number	Length and type of the literature	Detailed reference	The expression in the literature	The percentage of literary sources on this expression
p. 32	8 lines from Shakespeare.	<i>Hen. VIII.</i> act iii. sc. 2.	Case for the undirected overflow of nerve-force.	1/3. The only detailed one.
p. 79	3 lines from Shakespeare.		Description of the expression of envy and jealousy	4/5
p. 80	2 lines from a novel.	Mrs. Oliphant, <i>Miss Majoribanks</i> , p. 362.	Case of 'undirected overflow to save the lost one'.	1/1
p. 104	1 line from an ancient fable; 1 line from a dictionary.	Aesop's Fables of the 'Ox and the Frog'.	Case of the frog's inflation of the body as a means of exciting fear in an enemy. <sup>145</sup>	2/3
p. 121	4 lines from a poem.	William Somerville, <i>The Chase</i> , book i.	Case of grinning of dogs in affection emotion.	1/5. The only detailed one.
*1890 p. 126	2 lines in a footnote, from an ancient poem.	Mr. Baudry in a letter to Darwin provides a passage from the 'Rāmāyana'.	Case of a dog's leaking the hand of its host.	1/2.
*1890 p. 129	2 lines in a footnote, from	Nearly 5000 years old from Egypt,	Case of a dog's tail being tucked in	1/2.

<sup>145</sup> 'This action must have been observed during the most ancient times, as, according to Mr. Hensleigh Wedgwood, the word toad expresses in all the languages of Europe the habit of swelling' (p. 104).

	an ancient inscription.	this note is taken from a newspaper clipping, preserved by Charles Darwin, but without date or title.	between its legs out of fear.	
p. 151	1 line from a novel.	Mrs. Gaskell, <i>'Mary Barton,'</i> new edit. p. 84.	Case of the squarish outline of an infant's mouth when screaming.	1/1.
*1890 p. 166	3 lines in a footnote, from an ancient poem.	Geoffrey Chaucer, <i>The Nonnes Priestes Tale</i> , composed in the 1390s. Darwin's attention is called to this passage by Sir W. Gull.	Case of firmly closed eyes when shouting.	1/2.
p. 184	1 line from a novel.	Walter Scott, <i>Red Gauntlet</i> .	Change of face in grief.	1/2
p. 198	1 line from an ancient poem.	Homer, <i>Homeric Hymns</i> .	Case of the meaningless laughter of young persons who have passed childhood.	1/2.
p. 217	10 lines from an ancient poem.	Homer, <i>Worsley's Translation of the Odyssey</i> , Book xvi. st. 27; Book xxiii. st. 27.	Cases of the expression of tender <sup>146</sup> .	2/3. Only detailed descriptions.
p. 230	1 line from ancient plays.	Plautus (254-184BC), <i>'Miles Gloriosus,'</i> act ii. sc. 2.	Case of the expression of perplexed reflection.	1/3.

<sup>146</sup> 'The feelings which are called tender are difficult to analyse; they seem to be compounded of affection, joy, and especially of sympathy' (Darwin 1872: 216). Obviously, Darwin has overlooked the plenty of cases contained in the answers to his Method 5 Questionnaire about the overlap of emotions but resorts to the literary texts.



p. 242	1 line from ancient poem.	Homer, <i>Iliad</i> i. 104. Footnote is given in the 1890 edition.	Case of the bright eyes in extreme rage.	1/1.
p. 242	9 lines from Shakespeare.	<i>Henry V.</i> , act iii. sc. 1.	To sum up the chief characteristics of rage.	1/1.
p. 243	3 lines from novel.	Dickens, <i>Oliver Twist</i> , vol. iii. p. 245.	Case of the lips' protrusion during rage.	1/3. The only detailed one.
p. 261	2 lines from Shakespeare.		Case of spitting as the universal sign of contempt or disgust.	2/7.
p. 270	4 lines from Shakespeare.	<i>Merchant of Venice</i> , act i. sc. 3.	Case of shrugging the shoulders to express patience, or the absence of any intention to resist.	1/2.
p. 270	7 lines from a novel.	Mrs. Oliphant, <i>The Brownlows</i> , vol. ii. p. 206.	Case of shrugging the shoulders to express 'I won't do it'.	1/2. The only detailed one. The other case is cited from the <i>Journey through Texas</i> <sup>147</sup> , a book similar to Swinhoe's <i>Narrative</i> , as discussed in my foregoing Chapter 2.
*1890 p.289	3 lines in a footnote from the Bible.	Chauncey Wright gives several instances of its occurrence in the Bible. <i>Thus</i> :— Matt. xxvii. 39; compare also <i>Psalms</i> xxii. 7, and cix. 25.	Case of Turks and other Orientals shaking their heads in anger or strong disapprobation.	3/3.

<sup>147</sup> Olmsted. 1857. *Journey through Texas*, p. 352.

p. 279	6 lines from Shakespeare.	<i>King John</i> , act iv. scene ii. <i>Winter's Tale</i> , act v. scene ii.	Case of the eyes and mouth being widely open as an expression of surprise or astonishment.	2/2.
*1890 p.304	1 line in a footnote from the Bible.	<i>Cf.</i> Job xxi. 5, — Quoted by Mr. H. Holbeach in ' <i>St. Paul's Magazine</i> ,' Feb. 1873, p. 211.	Case of the hand being placed over the mouth as the expression of astonishment.	1/7.
p. 291	1 line from Latin phrases.		Case of the voice becoming husky or indistinct, or may altogether fail in the trembling of fear.	1/1.
p. 291	7 lines from the Bible.	Job iv. 13.	Description of vague fear.	1/1.
*1890 p. 311	4 lines in a footnote from an ancient poem.	Homer, <i>Odyssey</i> . xviii. 235-242 <sup>148</sup> .	Case of a man utterly prostrated by terror.	1/3.
p. 295	2 lines from ancient poem.	Brutus (85-42BC)	Case of the erection of the hair as a sign of fear.	2/3.
p. 316	2 lines from the Bible.	Book of Jeremiah chap. vi. 15.	Case of blushing in Jewish.	1/1.
*1890 p.335	1 line in a footnote from the Bible.	Psalms xxxiv. 5.	Further confirmation on a preceding reference, also as a response to Professor Robertson Smith <sup>149</sup> .	1/1.
p. 336	3 lines from Shakespeare.	<i>Romeo and Juliet</i> , act ii. sc. 2.	Case of blushing in the dark.	1/1.

<sup>148</sup> 'Mr. H. Jackson, in quoting the following passage from the 'Odyssey,' remarks that Homer "deliberately identifies the signs of despair with the symptoms of physical prostration" (p. 311).

<sup>149</sup> 'According to Professor Robertson Smith, these words (the above case) do not imply blushing. It seems possible that pallor is meant. There is, however, a word *haphar* occurring in Psalm xxxiv. 5, which probably means to blush' (p. 335).

*1890 p.379	2 lines in a footnote from a novel.	George Eliot. 1859. <i>Adam Bede</i> .	Response to Wallace's criticism <sup>150</sup> on Darwin's belief in the infant's ability to recognize the expression of emotions.	1/1.
p.366-367	7 lines from Shakespeare.	<i>Hamlet</i> , act ii. sc. 2.	Case of how our emotion is aroused by a simulation in our mind.	1/1.

## 7.2 Summary of the above data

### Types of literature and their functions in the book

As listed in Table 3.4 above, the literary sources cover Shakespeare and other's plays, the Bible, novels, poems, and even fables. The testimonies from the Bible and ancient poems are sometimes to evidence that in ancient time<sup>151</sup> people (and animals) expressed their emotions in the same manner as in Darwin's era, e.g. on page 129\* and 304\* (\* means in the 1890 edition). They may be the only source of Darwin to verify his universal belief in time dimension. Another type of literature that too contributes to the second hypothesis on universality, but in regional dimension, is Shakespeare's plays. They are occasionally used to describe European expression of emotions. For example, on page 279 after bringing out the hypothesis that, 'The eyes and mouth being widely open is an expression universally recognised as one of surprise or astonishment' (p. 279), Shakespeare's two dialogues are at first cited. Immediately following them are the questionnaire answers about this expression in remote areas<sup>152</sup>.

<sup>150</sup> 'Wallace ('Quarterly Journal of Science,' Jan. 1873) makes the ingenious objection that the strange expression on the nurse's face may have simply frightened the child and thus made it cry. Compare the case of Chad Cranage, the blacksmith, in 'Adam Bede,' at whom, when he had his clean Sunday face, his little granddaughter used to cry as at a stranger.' (p. 379)

<sup>151</sup> The expressions of the ancients are described in those literature, spanning the period of more than five thousand years until Darwin's time. The earliest one may be the Egyptian inscription referred to on page 129 of the 1890 edition.

<sup>152</sup> Except for Shakespeare's works, the other literature in the 1872 edition depicting human expression are seldom attached to specific races or regions, while in the second edition some new ones are added to supplement the questionnaire data on distant races. For example, the one on page 304\* accounts for one of the seven cases, and the other six are from the query answers. With enough proofs, Darwin is able to confirm his universal belief that, 'This has been observed with so many races of man that it must have some natural origin' (p. 304). Also, on page 289\*, there are three cases of Turks and other Orientals shaking their heads, all cited from the Bible.

Darwin's attitude to the plays of Shakespeare is that, 'Shakespeare, who from his wonderful knowledge of the human mind ought to be an excellent judge' (p. 366). In contrast, the descriptions in some less famous works are roughly taken as scientific observations without any information on the contributors. For example, when a testimony is extracted from a recently published novel, the novelist is always simply announced as 'an excellent observer' (Darwin 1872: 80, 151, 270). It seems that in Darwin's mind the classic writings, such as those of Shakespeare, Homer and Dickens, are more trustworthy and acceptable to him and his readers. Among all the literary types, Shakespeare's plays are most seriously treated, which is similar to Duchenne's attitude to them in the *Mechanism*, though examined by different means. On the problem of whether or not people can blush in the dark, Darwin in 1872 claims that, 'Shakespeare, therefore, erred when he made Juliet, who was not even by herself, say to Romeo (act ii. sc. 2):— "Thou know'st the mask of night is on my face; Else would a maiden blush bepaint my cheek, For that which thou hast heard me speak to-night."' (p. 336). Later in the 1890 edition, it is added with Mr. Topham's suggestion (letter, 5th December 1872) that Shakespeare means that the blush is unseen, not that it is absent (Darwin 1890: 355).

#### Revealing the weaknesses in Darwin's data collection

Table 3.5 Summary of the information in the last column of Table 3.4

Types	Numbers	Details
1/1 (2/2) or the only detailed one	18	11x 1/1, 2/2, 3/3; single detailed: 2x 1/3, 1/5, 2/3, 1/2
More than 1/2	3	4/5, 2/3, 2/3
1/2	6	6x 1/2
Less than 1/2	4	1/3, 1/3, 2/7, 1/7
Total number	31	

The last column of Table 3.4 gives the percentage of literary sources in Darwin's discussion of each expression. Table 3.5 further summarizes this information. The first column notes the types of proportion from large to small, e.g. from 1/1 to less than 1/2. The second column records the numbers of literature to each type. For example, the '18' in Row 2 means that there are 18 '1/1' in Table 3.4. The last column notes the details in each type, e.g. the 18 '1/1' includes eleven '1/1', one '2/2' and one '3/3', and so on. The bottom row counts the total number of literature listed in Table 3.4. We can see that, there are 31 expressions (or expressional problems) discussed with help

of literature. It plays the primary role in illustrating more than half (18) of them, as the only (detailed) example. There are just four expressions, in which literature contributes to less than 1/2 testimonies. See also the third column, except for the '1/7' and '2/7' in Row 5 with seven cases, the other expressions only have 2-3 examples in all. It indicates that, in most cases, only when Darwin is lack of evidence on some problems, will the works of fiction be utilized. To put it in another way, literature, as an unusual source, marks the weak points in Darwin's data collection for supporting some arguments. For example, on page 289\*, the three cases of Turks and other Orientals shaking their heads to indicate negation are all cited from the Bible. This behaviour is asked by the last question in Darwin's questionnaire (Question 17 in the 1867 version). The use of literature on this problem shows that, first, confirmative observations on this behaviour, shaking the head to express negation, are basically insufficient; and second, positive answers from Turks and other Orientals are especially few. In fact, as enumerated in Table 2.6 of my foregoing Chapter 2, from Asia there is no P\* (positive and detailed) answers but three N\* (negative and detailed) replies. Besides, throughout the questionnaire survey, Darwin had received no report from Turkey or about Turkish expression at all<sup>153</sup>.

### **Conclusion**

In this chapter we have examined Darwin's use of the third method, Recognition experiment, and the hidden method, Literary approach. At first, Part I reads information from Darwin's manuscript to reconstruct the procedures in the recognition practices. From Darwin's annotations to the *Mechanism* and his correspondence with Crichton-Browne, we can see a consistent inquiry into human muscular problems. This fact is further revealed in Part II by locating the ten experiments in the *Expression of Emotions*. Darwin's discussions around Duchenne's plates and the testing results on them both help to understand the movements of specific muscles in emotions. From Section 3 to Section 5, it shows a steady decrease of Darwin's original contribution to the discussions: Duchenne's photographs are mentioned at first to compare between the experiment pairs in Section 3 and finally in Section 5 only to describe the expressions they ought to display. A comparison between the original data on the manuscript and their published forms in the book finds that, in order to bring out some arguments or to highlight the facial features in the photographs, Darwin has often made revisions in reporting the results. The best source to evince Darwin's embarrassments in dealing with some intricate problems maybe the texts quoted from literature. As Part III suggests, the use of works of fiction, like poems and

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<sup>153</sup> Darwin did have informants in Turkey, but they were not on the list to receive one of the fifty copies of the questionnaire in 1867.

novels, indicates the shortage of observational examples.

In our Chapter 6, we will offer a final conclusion to the interlinks, e.g. the competition and cooperation, between Darwin's several methods. Here I want to exhibit an interesting fact learned from the biographical research in this chapter. Hensleigh Wedgwood, as a member of the Darwin-Wedgwood family, had participated in both Method 3 Recognition experiment and Method 8 Literary approach. See Table 3.2 above, his name is recorded with his two sons in the first answer square of Table (b) on the manuscript. Furthermore, he also helped Darwin to understand one piece of literature. On page 104\* of the *Expression of Emotions*, Aesop's fable, the *Ox and the Frog*, is mentioned to exemplify the frog's inflation of body as a means to threaten its enemy. In discussing this example, Darwin is inspired by an idea from his cousin: 'This action must have been observed during the most ancient times, as, according to Mr. Hensleigh Wedgwood, the word toad expresses in all the languages of Europe the habit of swelling' (Darwin 1890: 104).

The following two chapters, Chapter 4 and 5, will introduce the successive developments of Method 3 and 8 in the works of two prominent psychologists, Antoinette Feleky and Otto Klineberg respectively. Before we enter into the discussion positioned in the school of American psychology, I would like to highlight the common concerns in these chapters as a brief introduction.

#### **Preface to Chapter 4 and 5**

Darwin in the *Expression of Emotions* has summed up earlier studies of expression, mostly in the physiological domain, including the achievements in anatomy and neurosciences. For example, his discussions of Duchenne's photographs almost entirely rely on the ideas from those physicians and physiologists, e.g. Charles Bell, Duchenne, Müller and Spencer. We can say that the expressional study was physiologically summarized and scientifically opened up by Darwin. While, on the other hand, the psychological and cultural concerns on expression are not clearly stated but often downplayed or restrained in the *Expression of Emotions*. For instance, as identified in the preceding Chapter 2, cultural concepts of expression had already been recorded in some of the Asian answers to Darwin's questionnaire but were discarded in publication. The next Chapter 4 will show that Feleky's recognition experiments<sup>154</sup> in the 1910s were still influenced by a physiological doctrine. Following Feleky's step, Klineberg also studied at the Psychology Department of

<sup>154</sup> As shown above, the diverse backgrounds of the viewers are only introduced in the beginning but seldom mentioned by Darwin in discussing the results. In Chapter 4, we will see how the following testers dealt with this problem.

Columbia University. However, his literary study of expression in the 1930s bears much more cultural concerns and benefited quite a lot from anthropological methods, as will be shown in Chapter 5. Klineberg's divergences in research methods and concerns from the conventional regime eventually led to an institutional reform in the university that a new Department of Social Psychology was separated from the old school by Klineberg.

Another thread to link the two chapters, and the stuff to fill in the gap between these key scholars, is the trend of Scientific Racism from the 1880s to 1940s. During that time, there were many racist arguments masked under the name of some scientific or pseudoscience reports. Chapter 4 looks at this trend in a specific case, Katherine Blackford's personnel physiognomy, or called 'character analysis'. Chapter 5 then provides a trackable history of this trend starting from the eugenic movement launched by Darwin's cousin, Francis Galton. The final beat to this trend in American society was actually given by Klineberg with a successful law case to end racial segregation in American public schools. In this process, we will see how Klineberg's research interests and methods benefited from other opponents of Scientific Racism, e.g. his PhD supervisor, the famous American anthropologist Franz Boas. With such an arrangement of these chapters, I hope that the readers can be acquainted with both the knowledge of the developing Darwinian methods in the studies of expression and the background picture of the whole period.

## **Chapter 4 From Photographic Physiognomy to Piderit Faces: the Context for Antoinette Feleky's Recognition Experiments**

The third method listed in the *Expression of Emotions*, the Recognition experiment, has been summarized in the previous chapter. Darwin in 1868 showed a set of photographs produced by Duchenne to a group of people to judge what emotion was being expressed. This method in practice has three essential elements: first, photographed expression; second, a group of viewers; third, judgements from the viewers. One of the first to subsequently develop similar practices was American psychologist Antoinette Feleky in the 1910s. In contrast to the galvanizing method used by Duchenne to activate facial expressions, the expressions in Feleky's photographs were posed according to the subject's (Feleky's) own will. While Feleky's photographs have received considerable attention from subsequent scholars, the processes and results in Feleky's recognition experiments have rarely been examined. This chapter attempts to contribute to this scholarship by researching the second and third elements in her tests with a quantitative analysis. Apart from that, to understand Feleky's achievements, we need a filling in of context, both before and after her work. Here, the diversity in the first element aroused my interest. Thus, four types of photographed expressions will be introduced in chronological order. They are (1) expression of physically-stimulated emotions, (2) static countenance, (3) expression of introspective emotions of Feleky and (4) a composed facial model (Piderit faces). The first two kinds of expressions that emerged before Feleky will be briefly introduced in Part I. The last two expressions that contributed to recognition experiments are the main focuses of this chapter, discussed in Part II and III respectively. The threads through the whole chapter are photographic studies of human faces in chronological order and their responses to Darwin's theories or selective use of Darwinian legacies.

With the first expression type of physically-stimulated emotions, it was recorded by Darwin's correspondent, Italian anthropologist Paolo Mantegazza. Mantegazza had produced an atlas of pain and sent it to Darwin in 1872. This atlas was taken along his ethnic surveys, noting some findings accordant or conflicting with Darwin's expressional theories. This will be introduced in the first section of Part I. Later in the 1900s, as a careful reader of Mantegazza, American character analyst Katherine Blackford demonstrated labor traits with photographed countenance. Though claiming an inheritance from Darwinian evolutionism, Katherine's personnel physiognomy led to racist claims in the end. Mantegazza's and Blackford's works will be separately discussed in the two sections of Part I *Photographical physiognomy between Darwin and Feleky*.



Part II is *Feleky's recognition experiments: emotional studies in a physiological trend*. It closely focuses on Feleky's research. Feleky's emotional study at the beginning of the twentieth century was a lab-based job and was largely influenced by the psychophysical doctrine set by the James-Lange theory. This physiological trend in the new school of psychology will be introduced in Section 3. Feleky's research was conveyed in her three writings within only ten years' time. A problem in her family had interrupted her academic life. This background and her first publication will be introduced in Section 4. Section 5 and 6 regard her last two monographs respectively. These sections seek to evaluate Feleky's experiments by quantitatively reanalyzing her original data. In this process, the pros and cons in the design of experiments and her contribution to emotional science will be uncovered. Feleky's final work on emotion was published in 1922, exactly fifty years after the *Expression of Emotions*. It was a comparatively-neglected landmark in the history of emotional science. Section 6 will find out how it had advanced the science from Darwin's time.

The last expressional type, a facial model, will be introduced in Part III *Recognizing false emotions immediately after Feleky: pure psychological approach*. Aside from Feleky, in 1920s America there were some other scholars who had carried on the interview method in recognizing expression. Among them, there were series of experiments with a composed facial model rather than real human faces. They are introduced here to reflect the pure psychological approach, in contrast to Feleky's physiological concern. Similarly, a quantitative analysis of their experimental processes can better demonstrate their achievements and meanwhile evince the meaning of Feleky's reliance on the emotions in real human faces.

At the end of this chapter, I will consider, on one side, Darwin's possible 'opinions' on the subsequent research of the four types of photographed expressions. On the other side, the successors' selective use of Darwinian legacy will also be summarized. With a particular focus on recognition experiment, its development should be understood in the larger context of psychological transition.

## **Part I: Photographical physiognomy between Darwin and Feleky**

### **1 Mantegazza's expressional study**

Paolo Mantegazza (1831-1910), M.D., was a famous Italian physiologist<sup>155</sup> and anthropologist<sup>156</sup>, the founder and President of the Italian Society of Anthropology.

<sup>155</sup> In the 1860s, Mantegazza established the first pathology laboratory in Italy.

<sup>156</sup> After several years' pathological research at University of Pavia, Mantegazza moved to University of Florence and became the first chair of anthropology in 1870 (British Medical Journal 1910: 824).

From the 1850s he started to publish a series of books on the physiology of mental states, including *Physiology of Pleasure* (1854), *Physiology of Pain* (1880), *Physiology of Love* (1885) and *Physiology of Hate* (1889). At the same time, he also wrote on physiognomy (see his *Physiognomy and Mimics* (1883), translated into English as the *Physiognomy and Expression* (1904)). He was a regular correspondent to Darwin before the latter's death. They exchanged ideas and copies of their volumes. Mantegazza was responsible for translating the *Origin of Species* into Italian and publicizing Darwin's ideas and works in his country (see his *Charles Darwin and his latest book* (1868))<sup>157</sup>. His name appeared on the presentation list to receive the first copies of the *Expression of Emotions*. In a letter to Darwin in December 1872, Mantegazza mentioned that some of his experimentations on expression would be published in an album, which came out four years later as the *Atlas of expression of pain; photographs taken from life and many works of art, illustrating the experimental studies on the expression of pain* (1876).

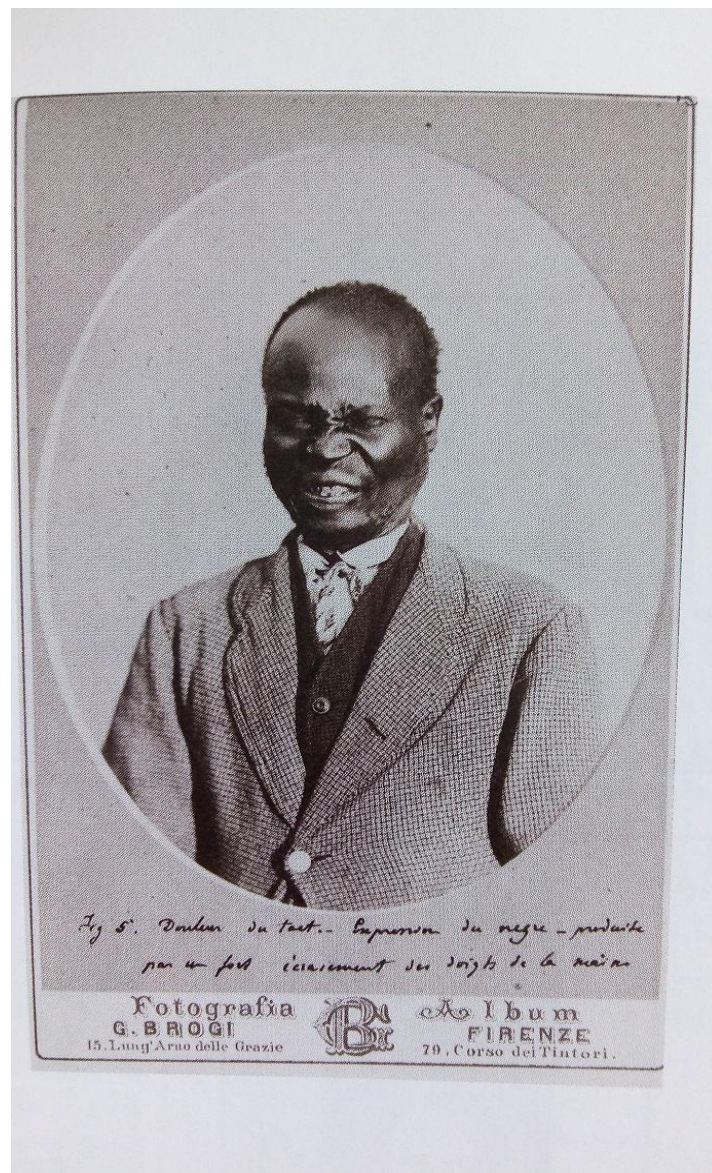


Fig. 4.1 Paolo Mantegazza subjecting himself to painful stimuli (Mantegazza 1876)

<sup>157</sup> For more information about the reception of Darwinism in Italy, see Kohn (1985) and Ruse (2013).



Fig. 4.2 The three degrees of anger, surprise and irony (Mantegazza 1876)<sup>158</sup>



<sup>158</sup> The original copy is stored in Museum of Natural history, University of Florence.

Fig. 4.3 ‘A Negro’ posing in pain (Prodger 2009: 214)

The photographs consulted in Darwin’s recognition experiments were produced by Duchenne faradizing the faces of several patients in his asylum. In contrast, Mantegazza took the photographs of healthy subjects undergoing natural stimuli, such as bright light, extreme noises, acid fruit and crushing of fingers. The subjects includes three kinds of people. The first is Mantegazza himself, as shown in Fig. 4.1 above. The second is a professional actor, seen in Fig. 4.2. The last are people whose photographs were taken during Mantegazza’s trips in South America, Lapland and India, see Fig. 4.3 above. The published atlas comprises twenty-eight pages, and fifteen of the photos were sent to Darwin on 23rd December 1872 (Prodger 2009: 213). Mantegazza in that letter confirmed three expressional cases in the *Expression of Emotions*.

The first confirmation was about Monkeys’ reaction in terror. Darwin wrote in the *Expression of Emotions* that ‘Monkeys also tremble from fear; and sometimes they void their excretions’ (Darwin 1872: 146). It was endorsed by Mantegazza in the letter with his observation in Paraguay, South America, that *Mycetes caraya*<sup>159</sup> void their bowels from terror (Mantegazza 1872)<sup>160</sup>. The second case was respiratory expression in pain. In Chapter III evidencing the third Principle of the direct action of the excited nervous system on the body, Darwin argues that ‘When animals suffer from an agony of pain... Almost every muscle of the body is brought into strong action’ (Darwin 1872: 69); with man the mouth might be closely compressed, and the circulation and respiration were much affected: ‘the breath may be held until the blood stagnates in the purple face’ (p. 69-70). Mantegazza wrote to Darwin to explain the reason that, ‘during the most intense physical pain man closes his mouth and holds his breath, since by producing a slight degree of asphyxia, general sensibility is diminished and suffering is assuaged’ (Mantegazza 1872). The third accordance was about analogy between physical pain and pain of a higher order. In line with Darwin’s evolutionary stand to link human being with their animal ancestors<sup>161</sup>, Principle 1 is often raised to explain the correlation between human’s animal-like expression and the expression of a higher order (like the sense of morality, immorality and shame)<sup>162</sup>. Mantegazza informed Darwin a case that was in accordance with the First Principle about the

<sup>159</sup> The black howler monkey is now known as *Aloutta caraya* (Burkhardt et al. 2013: 647).

<sup>160</sup> In Burkhardt et al. (2013: 646-647).

<sup>161</sup> In almost every parts of the book, Darwin intends to verify that animal expressions, which were believed by Charles Bell as plain as the ‘acts of volition or necessary instincts’, are almost as expressive as those of man (Darwin 1872: 146). At the end of each chapter, there is usually an announcement of success against Bell’s creationist viewpoint.

<sup>162</sup> For example, following the above discussion of pain, this correlation is associated with the First Principle that ‘actions of this kind are often combined with others, which follow from our first principle, namely, that actions which have often been of direct or indirect service, ..., are still performed under analogous circumstances through mere habit, although of no service (Darwin 1872: 81-82).

analogy between a serviceable expression (in physical pain) and an unserviceable one (pain of a higher order). It is that the expression of a man with aloes in his mouth is identical to the state when feeling injuries to self-esteem (Mantegazza 1872).

We can see that all the three cases grew out of Mantegazza's studies of pain. However, his later publications conflict with Darwin's belief in expressional universality among human races while affirming the cultural and individual differences as discovered in Chapter 2 from the answers to Darwin's questionnaire. In Section 5.2 of Chapter 2, data from the query answers exhibit that some expression of emotions differ between genders and age groups. Mantegazza in the *Physiognomy and expression* (1904) likewise notes the gender, age and racial differences in expressing pain. With gender, he wrote that, 'Men and women express their pains differently, even when they are of the same degree. The differences become greater in proportion as we rise in individual and ethnical rank. Generally grief is translated in women into stupor or violent reactions; tears are very frequent. ... a man's expression of grief the character of resistance' (Mantegazza 1904: 127). With age diversities, he wrote that 'Age, still more than sex, modifies the expression of pain.' (p. 127-128). The expressions of grief at different ages were classified by Mantegazza into five types: Childhood: cries without tears, abundant weeping; Adolescence: calm and melancholy sadness; Youth: menacing reaction; Adult Age: expression of bitterness; Old Age: plaintive groans and tears (p. 128). Mantegazza's next finding opposite to Darwin's idea was racial differences, resulting from his extensive ethnic surveys. As early as in the *Atlas* (1876), portraits of 'a Negro model', see Fig. 4.3 above, are illustrating racial differences in response to painful stimuli. After that, in Mantegazza's ethnographic investigations<sup>163</sup>, photography was used to document his observations, seen in Fig. 4.5 below. As an anthropologist, Mantegazza was concerned with the diminishing racial characteristics in the trend of modern civilization (see Hill and Minghelli 2014: 80).

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<sup>163</sup> See *A trip to Lapland* (1881) and *India* (1884).





Fig. 4.4 ‘Something Like a Mirror’<sup>164</sup>

Immediately after Mantegazza, an Italian physiologist, Angelo Mosso<sup>165</sup> (1846 -1910) produced a similar atlas of pain by oppressing fingers of the attendees including himself (Mosso 1896: 201). Mosso’s findings too echo the age differences in painful expressions (p. 203). Cesare Lombroso (1835-1909), as the leading Italian anthropologist in Mantegazza’s time, also used photographs to demonstrate human facial features. Nevertheless, since Lombroso’s work mainly concerned cranial features rather than emotion and became a new subject of criminology, it is excluded from this section’s discussion<sup>166</sup>. After the Italian research, in the first ten years of the twentieth century, there were not many serious studies on human emotion with photographed subjects. Painter Rudolph (1903) drew self-portraits to record his emotions, but those drawings should not be considered, ‘since they do not assess objective accuracy of facial expression’ (Leeland 2008: 25). In America, alongside industrialization, there emerged an interest in modern physiognomy for the selection of labour forces. The leading practitioner Katherine Blackford, an assiduous reader of Mantegazza, not only photographed human faces but also carried on racial studies, inquiring into the correlation between physical traits and personalities. Her research

<sup>164</sup> Presented at the National Museum of Kraljevo, Serbia, 27 May – 8 June, 2014. The work is based on the archive material at Museum of Anthropology in Florence.

<sup>165</sup> Mosso invented the first neuroimaging technique and was credited the foremost Italian physiologist of his generation (Sandrone et al. 2012). For a full review of his achievements in neurology, see Sandrone et al. (2012); and Sandrone et al. (2014).

<sup>166</sup> Mantegazza had provided some skulls for Lombroso’s research, their contacts are recorded in Lombroso and Ferrero (2004). Lombroso’s arithmetical measurement of human physical features was much similar to Francis Galton’s work that will be introduced in the next chapter with the trend of Scientific Racism. For an examination of his arithmetic, see Gould (1996).

combined modern managerial science with racist discussion, which will be introduced in the following section.

## 2 Katherine Blackford's character analysis



DR. KATHERINE M. H. BLACKFORD  
Author of  
THE BLACKFORD COURSE IN READING  
CHARACTER AT SIGHT

Fig. 4.5 Dr. Katherine Blackford (Blackford and Newcomb 1918:4)

As mentioned in Chapter 1, the photographic technique at initial creation was for commercial use. It was later applied in scientific research, such as in the physiological practices of Duchenne and Darwin as well as the psychotherapy of James Crichton-Browne<sup>167</sup>. In 1872 seeing the publication of the *Expression of Emotions*, photography was also applied in business and managerial industry<sup>168</sup>. At the turn of the century (from the end of the nineteenth century to the start of the twentieth century), Frederick Taylor<sup>169</sup> (1856-1915), who founded modern managerial science, photographed workers' motions<sup>170</sup> to standardize manufacturing process. After Darwin and Mantegazza, reading human faces via photographs was conducted in Taylor's period by a female business consultant, Katherine Blackford. Her work was a revival of

<sup>167</sup> The general history of photography before Darwin is well presented in Prodger (2009: xxi – xxiii).

<sup>168</sup> Eadweard Muybridge photographed fast motions in 1872 (Brown 2005: 10).

<sup>169</sup> Frederick Taylor was one of the first management consultants and the intellectual leader of the Efficiency Movement. His *Shop Management* (1911) and *The Principles of Scientific Management* (1914) were popular manuals in the coexistent American corporations. For an introduction to Taylor and his contribution to scientific management, see Nelson (1980); for a general history of management science in the early twentieth century America, see George (1972), Witzel (2002), and Wren (2005).

<sup>170</sup> See his *On the Art of Cutting Metals* (1906).

physiognomy and was bound up with Scientific Racism<sup>171</sup> — the background of the contemporary human sciences. Blackford's research is typical in understanding modern physiognomy and the scientific-racism trend. It is introduced in this section with two subsections. Section 2.1 *Reading portraits* introduces Blackford's work on reading human faces. Section 2.2 *The racist belief alongside character analysis* tells the mutual influences between her ideology and findings.

### 2.1 *Reading portraits*

Born in Kansas, Katherine Blackford (1875-1958) received a M.D. degree in 1898 from College of Physicians and Surgeons in Keokuk, Iowa (Brown 2005: 27). During her medical practice, Blackford became interested in the diversity of human races. After a global trip to pursue this interest, she settled in New York City working for Harrington Emerson<sup>172</sup> (1853-1931), an American pioneer in industrial engineering and management. They endeavoured to invent labour screening technique to compete with the prevailing methodology of Taylor. Blackford became an expert in this field by importing the thoughts of physiognomy. She believes that people's mental abilities are associated with their physical features. Therefore, according to Blackford, to identify a labourer with suitable capacity on certain tasks, one only needs to look for the ideal external manifestations corresponding to such inner traits. The above is the theoretic base of Blackford's personnel physiognomy. In practice, she spent fifteen years advising interviewees in regard to their vocations and counselling employers for selecting and assigning employees (Blackford and Newcomb<sup>173</sup> 1914: vii).

In order to demonstrate the ideal facial features of prominent labours, hundreds of male portraits were collected from business magazines and newspapers. There are several characteristics in Blackford's selection of these portraits and photographs. First, the men in the photographs are divided by their social classes: the so-called successful class and lower classes. To describe typical facial features of a good staff, Blackford referred to the well-known social reformer Jacob Riis (1849-1914). Conversely, to represent the sorts of an unsuitable employee, those from ordinary classes were usually chosen. Second, all the photographs are highly stylized to show a solemn countenance without expressing any emotion. To sum up their characteristics in one

<sup>171</sup> At the turn of the century, there emerged a huge number of books and articles on racism. Most of them were just the authors' arbitrary judgements, while some of them were masked under some kinds of 'scientific' arguments. This trend was later called as Scientific Racism. For a general history to this trend, see Dennis (1995) and Tucker (1996); for a critique to Scientific Racism, see Gould (1996).

<sup>172</sup> He founded the management consultancy firm, Emerson Institute, in New York City in 1900. For an autobiography and introduction to his life, family and contribution, see Harrington Emerson Papers 1848-1931.

<sup>173</sup> Arthur Newcomb (1873-1912) was the second husband of Blackford. They coauthored in some of her treatises.



sentence: the photographs selected for labour-character reading only capture and demonstrate static facial features.

### Personnel physiognomy

Apart from portraits and photographs, Blackford studied human faces also from other sources, such as literature and artworks. In the *Job, Boss and Man* (1914), some ancient assumptions on psychophysical correspondence are introduced. They are recorded on an Egyptian papyrus document dating back to the Twelfth Dynasty, circa 2600 B.C.<sup>174</sup>. This thought, according to Blackford, coincides with some sparkles in Aristotle physiognomy and Homer's poetry. From the ancient and modern literatures (of her time) on expression, she concludes eight typical physical features attached to occupations and inner traits. They are: 'The high brows and lean cheeks of the thinker and scholar; the high, large nose of courage and aggressiveness; the thick neck and fleshy lips of sensuality; the thin lip and cold eye of cruelty; the round face and full figure of good nature; the dark eyes, hair and skin of revenge; the keen, sharp face of the scold; and the broad, flat face of phlegmatism' (Blackford 1914: 112). In Chapter VIII she assumes nine fundamental physical variables in which men differ or vary from one another. They are (1) colour, (2) form, (3) size, (4) structure, (5) texture, (6) consistency, (7) proportion, (8) expression and (9) condition. In talking about the variable of colour, evidence is drawn from paintings and pottery of ancient Egypt and Europe. She claims that 'divinity, royalty, nobility, and aristocracy are represented by white skin, blue eyes and flaxen hair' (p. 118). The 'causes of the attitude toward blonds revealed in art, in literature, in the drama, and in popular speech, will aid us in understanding the many differences between blonds and brunettes'. Such praise on blondes soon led to a systemized racist declaration, published two years later as the *Blondes and Brunets, Character Analysis, and Human Resources* (1916).

### *2.2 The racist belief alongside character analysis*

Although Blackford herself was not a blonde, yet she insisted on the 'law of colour': 'In brief, always and everywhere, the normal blonde has positive, dynamic, driving, aggressive, domineering, impatient, active...characteristics; while the normal brunets has negative, static, conservative, imitative...characteristics.' (Blackford and Newcomb 1916; Brown 2005: 30). Her *Blondes and Brunets* (1916) shows how racist arguments made use of Darwinian science, especially the evolutionary explanation on

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<sup>174</sup> Blackford may make a mistake here, because the Twelfth Dynasty of Egypt was 1991-1786 B.C., while 2600 B.C. fell in the Second (-2686 B.C.) to the Forth Dynasty (2613 B.C.-).

organisms<sup>175</sup>. ‘This process of selection’, Blackford argues, ‘developed a race with noses high in the bridge, well set out from the face, with narrow, elongated nostrils.’ (Brown 2005: 30). In her global journey to observe races, she took notes on the racial differences of noses, concluding that ‘next to colour, the nose is one of the most easily observed and popularly regarded indications of characters (Blackford and Newcomb 1916; Brown 2005: 30). Later, observing noses comprised a major part in her character reading practices<sup>176</sup>. In short, Blackford’s racist ‘law’ helped to form her character reading technique, though both of them are regarded as pseudo-sciences.

Blackford’s findings above stemmed from both the global tour to explore different races and her long-time personnel enterprise. The subsequent physiognomists and character readers, such as Holmes W. Merton and William Judson Kibby, just followed Blackford’s framework and utilized her technique, and therefore bore less racist colour. These modern physiognomists did not take full advantage of the photographic technique, because what they need were merely stationary portraits of facial features. When character analysis, as a blend of Scientific Racism and managerial technique, was at last supplanted by the school of Individual Psychology in the late 1920s, photography started to play a bigger role in the studies of expression.

## **Part II: Feleky’s recognition experiments: emotional studies in a physiological trend**

Now we come to the core texts in this chapter to introduce the last two kinds of photographed expressions (of human emotions and of a facial model) that had contributed to the practices of recognition experiments. Part II and III will deal with the true and false emotions respectively. Part II firstly introduces the first post-Darwinian recognition practice by Antoinette Feleky in 1910s America. Her work was conducted in the school of psychology when it was dominated by a physiological trend. This trend as the background of Feleky’s period will be introduced in Section 3. The following sections (Section 4 to 6) will examine her serial experiments with a quantitative analysis. By looking into the processes and reanalyzing her data, we can get a vivid picture of Feleky’s work and more deeply understand her contribution. More than that, the reanalysis will resolve another longstanding problem from

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<sup>175</sup> Blackford’s earlier treatises have some superficial applications of biological knowledge. She wrote in *The Job, the Man, the Boss* that, ‘This law of the survival of the fittest applies also to the survival of mental and physical traits. In short, there is no aptitude, trait or characteristic in man which is accidental’ (Blackford 1914: 106). While, the *Blondes and Brunets* applies this knowledge to explain racial distinctions of nose.

<sup>176</sup> In fact, both as the results of Blackford’s worldwide trip to observe races, her book of racism - *Blondes and Brunets* and her character reading books and manuals came out in the same period after the travel.

Darwin's time. Chapter 2 has pointed out that the pre-descriptions in Darwin's questionnaire (Method 5) would affect the informants' recognition on the emotions. Due to this problem, Darwin in the third method, the Recognition experiment, had changed his question from *Is it the true emotion expressed in the photograph* to *What emotion do you think the photograph displays?* This suggestive effect of questions also existed in Feleky's experiments. By reassembling her data and inviting an outside observer, such effect can be uncovered. Part III will further show how this effect was examined by later psychologists.

### **3 The physiological trend in American psychology before Feleky**

#### Psychology from philosophy to experiments

At the end of the nineteenth century, psychology began to incorporate laboratory experiments. The early psychological philosophers were also responsible to establish the first psychology laboratories. George Trumbull Ladd (1842-1921), American psychologist and philosopher<sup>177</sup>, opened one of the first American laboratories on experimental psychology<sup>178</sup>. His major work was published in 1887 as the *Elements of Physiological Psychology*, which was still full of philosophical formulations as in the books of Alexander Bain. Seven years later, 1894, *Psychology, Descriptive and Explanatory*, completed his empirical discussion of mind science (Armstrong 1921: 640). James Mark Baldwin (1861-1934) was another Ladd-alike philosopher & psychologist, whose psychology was built upon philosophical framework, while establishing among the earliest laboratories. They carved out a way for subsequent physiological psychology that grounded itself on experimental results. Ladd<sup>179</sup> and Baldwin<sup>180</sup> both stress on psychophysical correlation – the intimate relation between physical mechanisms and consciousness phenomena (such as feeling, emotion, etc.). This argument was later endorsed by the great Harvard psychologist William James that, 'The general causes of the emotions are indubitably physiological' (James 1890: 448).

#### The influences of the James-Lange theory

Darwin in the *Expression of Emotions* concentrates on expressive behaviors rather

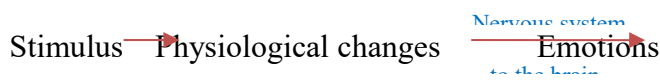
<sup>177</sup> He held professorship at Yale University from 1881 to 1905.

<sup>178</sup> Most scholars credit G. Stanley Hall (1844-1924) with the establishment of the first American psychological laboratory at Johns Hopkins University in 1883 (see Encyclopædia Britannica). Hall conducted a questionnaire survey on fear in 1897, aiming to investigate the causes of fear in one's own experiences rather than recognizing fear on others' faces. For more information, see Hall (1897).

<sup>179</sup> See his *Elements of Physiological Psychology* (1887).

<sup>180</sup> See his *Development and Evolution* (1902).

than the inner emotion. His reluctance to talk about emotion can be sympathized, since the mystery of emotion or feeling is not fully resolved even up to present, let alone at Darwin's time. In line with the physiological trend mentioned above, the cause of emotion was speculated on by James (1884) and Carl Lange (1885) with the James-Lange theory<sup>181</sup>. They propose that emotions are the outcome of physiological body changes, including respiratory movements, variation of heart rate and blood pressure, sweatiness and so on. They argue that all emotions are derived from the presence of a stimulus to evoke physiological responses. When the information is transmitted via the nervous system to the brain, the emotion is thus perceived or say experienced. To make it clear, the process of the James-Lange theory is shown in the chart below.



This model maintained a dominance of theoretical explanation to the cause of emotion and practical instruction on relevant experiments at the beginning of the twentieth century. Students of the James-Lange theory usually researched one physical response at a time. As the Harvard physiologist Walter Cannon (1871-1945) summarized in his famous book *Bodily Changes in Pain, Hunger, Fear, and Rage* (1915), there were studies on the roles of visceral nerves and adrenal glands in emotions. Cannon himself researched emotional influences on digestion. Until the end of the 1920s, there were some more studies, like the increase of blood corpuscles in emotions and the derangement of bodily functions in emotions (Cannon 1929: vi). At Columbia University, Feleky studied emotional effect on respiration<sup>182</sup>; her classmate, H. L. Oldfield<sup>183</sup>, investigated general problems of emotion; and J. Goldman inspected emotional impact on blood pressure. Compared to these physiological directions, Feleky's subsequent research with photography was more influential and long-lasting in scientific citation, reflecting the increase of psychological methods in place of that physiological trend.

## 4 Antoinette Feleky and her first publication

### 4.1 Antoinette Feleky and her husband

<sup>181</sup> Their theories of emotion were independently announced. Lange's article was published in Danish (Cannon 1927: 568). In 1887 James got to know Lange's theory from the latter's German edition. According to Titchener (1914), their research differentiated from each other in the roots of sources that James's theory was concluded from his own observations (James 1884:189), while Lange's was built upon medical practices. For more information, see Campbell (1997).

<sup>182</sup> Among the three works, the most influential and long-lasting was Feleky's research, mostly due to the photographs she projected and utilized in her research.

<sup>183</sup> Born in 1868 at England and immigrated to Washington, died at 1940.



Fig. 4.6 Antoinette Feleky (Feleky 1922)

Antoinette M. Feleky (1872-1950) was the wife of Charles Feleky (1865-1930). Both of them were Hungarians and immigrated to America in their childhoods (Nyirady 1995: 1). Their lifetime had been largely influenced by Hungarian culture, mainly due to the husband’s high enthusiasm for it. Charles Feleky, a musician, became interested in Hungarian publications in a touring performance. He started to collect all the books he could find about Hungary or written in Hungarian. This hobby turned their apartment into a library, which steadily grew to the largest and most comprehensive Hungarian collection in New York<sup>184</sup>. Antoinette Feleky, whilst assisting her husband’s collection, professionally lectured in the Psychology Department of Columbia University. She received a B.A. there and then a master degree in 1916<sup>185</sup>. Feleky was regarded as a pioneering experimenter in recognizing emotions<sup>186</sup>. Just before she could obtain a professorship at Colombia University, Charles’s death led Antoinette to step outside of research and begin compiling and categorizing their vast collections of material. After the 1920s, her publication was all about Charles’s professions and their Hungary collection<sup>187</sup>. Thus, Feleky’s psychological research on emotional expression

<sup>184</sup> For an introduction to Charles Feleky’s collection, see Nyirady (1995); for a history of Hungarian-American studies, see Vardy (1985).

<sup>185</sup> It was a degree of Master of Arts from the Faculty of Philosophy.

<sup>186</sup> Feleky was the first and foremost post-Darwinian scholar on emotion, as mentioned in Klineberg’s notebook (Klineberg 1954: 180).

<sup>187</sup> In 1938 she published the *Charles Feleky and His Unpublished Manuscript* (Nyirady 1995: 5).

was only within one decade's time (1914-1922), all based upon her master work. It consists of three pieces of work. The earliest is an article published in 1914, the first year of her master study. The second is her master's dissertation submitted in 1915. The final one is a book published in 1922, summarizing the previous results.

#### *4.2 Feleky's first publication on emotion*

##### Photographing emotions

In preparation for her master's dissertation, *The influence of the emotions on respiration*, some early-stage work was published as an article in 1914. This experimentation was among the first attempts to recognize human emotions (with a group of attendees) after Darwin<sup>188</sup>. The photographs were produced by Feleky herself with her own face. Unlike the galvanizing-stimulated faces utilized by Darwin, the emotions of Feleky were activated by her own wills. They were generated by two means. One was 'deliberately calling up the emotion itself', and the other was 'reciting words expressing the desired emotion' (Feleky 1914: 33). Compared to the galvanizing-made ones, Feleky's expressions were closer to the circumstances in natural emotions.

##### Recognizing emotions

In the experiment, eighty-six numbered photographs (of Feleky's upper body) were presented to one hundred viewers for them to judge which kind of emotion was expressed. In Darwin's test, the viewers were allowed to describe with their own words, comprising occasional vocabulary rather than fixed terms. In contrast, Feleky provided a sheet of 110 listed names of emotions for the viewers to choose from. These names are subtly classified. With 'love' alone, four types are listed: religious, altruistic, romantic and sensuous.

The viewers were firstly asked to read the list of names and keep them fresh in mind. Then the eighty-six photographs were one by one presented to them. The viewers should attach a name from the sheet to each of the photographs. In the end, the viewers were allowed to write (1) more words if the names on the sheet were not enough to describe the expression, and (2) their introspection when recognizing the emotions (Feleky 1914: 34-35).

##### Results and meaning

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<sup>188</sup> For other pioneers during this period, see Nuttin et al. (2014); Ekman et al. (1972); Berkowitz (1969).

As the outcome of the experimentation, twenty-four photographs and their corresponding answers were selected and published. The article consists of three parts: 1. The twenty-four photographs; 2. A statement of the stimulus in generating the expression in each of the photographs; 3. The recognition results of the one hundred viewers. The test results of the third part comprise a table as listed in Appendix B. In Feleky's words, the results help to study to what extent a facial expression can be recognized as the manifestation of a certain emotion; and also help to set a model for studying and illustrating emotional expression<sup>189</sup>.

Feleky's photographs were frequently used in subsequent research, however, neither Feleky nor the successors had analyzed the results and the accuracy of the table. We can see that the table is similar in format and distribution of results to my tables in Appendix A recording the Asian answers to Darwin's questionnaire. I now summarize Feleky's results by realigning the format of the table, to highlight the core information in it.

#### 4.3 A realignment of Feleky's results

To make it clear, I reverse the horizontal and vertical axes of Feleky's table and summate the numbers of answers to produce a new table, see Table 4.1 below. The first column is the photograph numbers and the emotional stimulus leading to the expression. From the second to the fourth columns, the top three answers to each numbered emotion are listed. The fifth column describes the characteristics of the photographed expressions. In addition, whether the expression had been tested by Darwin is marked in Column 6<sup>190</sup>. The last Column 7, as a reference group, is the answers from a Chinese observer not guided the listed names of emotion but from his own impressions on the photographs. The descriptive words he used are then recorded — the same with the final instruction in Darwin's recognition experiments. The reference group serves to eliminate the directive effect of the sheet of names provided by Feleky.

Table 4.1 A summation and realignment table of Feleky's results

Emotion	in	Top 1 answer	Top 2 answer	Top 3 answer	Characteristics	Whether tested by	Modification from a Chinese
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<sup>189</sup> Part III in this chapter will demonstrate some subsequent research immediately after Feleky's work.

<sup>190</sup> We are not establishing links here between the expressions consulted by Feleky and those tested by Darwin. The information in this column is not discussed in this section but will contribute generally to our final conclusion in Chapter 6.

photograph <sup>191</sup>					Darwin?	observer
3 modesty	Modesty 22.5	Coyness 10	Shyness 7 coquetry 6	Eyes seeing upward	No	Scorn
9 breathless interest	Surprise 30	Wonder 14	Astonishment 13 amazement 13	Mouth open	No	Similar to but not surprise
11 attention to an intellectual matter(quiz)	Attention 15 Interest 15	Calmness 9	Reflection 5 Expectation 4	Eyebrows high- low	No	Depression
15 attention to an object	Interest 22	Expectation 18.5	Attention 13	More relaxed than Photograph 11	No	Have no idea/attention (Led by sheet of names)
18 suspicion	Fear 18.5	Dread 9	Suspicion 6 Aversion 6	Cross hands, eyebrows oblique, look awry.	No	hatred
21 interest toward a child	Interest 23.5	Tenderness 10	Amusement 8.5 sympathy 7.5		No	love
22 agreeable surprise	Surprise 52	Wonder 12	Astonishment 10.5 Amazement 9	Moderate open mouth	Yes	surprise
29 pity	Tenderness 18	Sympathy 14.5	Coyness 11 pity 10		No	doubt
31 determination	Worry 3	Laughter 3	Scorn 2	Slightly frowning brows and shut mouth	Yes, related by Darwin to anger, then tested by Feleky.	Slight anger
32 righteous anger	Worry 8	Anxiety 7	Dislike 4 alarm 3.5 annoyance 3	More frowning brows than 31, and open mouth	Yes	anger
33 horror	Horror 35	Terror 13	Fury 9 fright 7		Yes	horror
38 physical pain	Physical suffering 31.5	Mental suffering 17	Worry 8.5	Right hand on forehead	Yes	Hard to say, seeing something terrible. Not a familiar expression to Chinese.

<sup>191</sup> Photograph 3 and 44 were posed by reciting related poems, and the others were posed by deliberately calling up the emotions.



44 fear	Terror 14	Fright 12	Horror 9.5		Yes	Anger and fear
47 hate	Disgust 12.5	Disdain 8	Contempt 7		No	contempt
48 sympathy	Worry 10	Anxiety 9.5 sympathy 9.5	Pity 5 mental suffering 5		No	Have no idea
50 despair	Alarm 6.5	Terror 5 mental suffering 5 worry 5	Anxiety 4	Left hand grasping hair (loosely)	Yes	Have no idea
51 rage	Horror 16.5	Bored 5	Annoyance 4	Mouth widely open, upper face anger, left hand going to clench	Yes	Indignation, certainly not horror
52 vanity	Coquetry 19	Vanity 10	Coyness 9 Pleasure 8	hand touch on hair and look up	No	Happily staring
55 disgust	Disgust 36	Repugnance 14	Annoyance 8 Sneering 8		No	Repugnance
61 sneering	Sneering 33	Contempt 19.5	Scorn 16		No	sneering
62 contempt	Contempt 21 disdain 21	Sneering 10.5	Haughtiness 9.5	More gender than 61: less open eyes smaller radian around mouth	No	Contempt
69 laughter	Laughter 40	Glee 17	Ecstasy 11 Merriment 10	Widely open mouth	Yes	Laughter
77 religious feeling.	Reverence 25 Religious love, faith 25	Religious 15	Prayer 6	put the palms together and look up	No	Pray
83 the first degree of suspicion	Suspicion 31.5	Timidity 7	Distrust 6 Fear 5	Look down and oblique	No	suspicion

#### 4.4 Problems in Feleky's test

A. Without an introduction to the viewers taking part.

At the beginning of Feleky's report, the one-hundred viewers are only recommended as 'reliable persons', while their gender, age, education status and cultural backgrounds are not informed at all. In fact, all these factors can affect their understanding and recognition of expression, as can be seen in the foregoing Chapter 2 from the diverse answers to Darwin's questionnaire<sup>192</sup>.

#### B. Directive effect of the names

Similar to Darwin's pre-description of the 17 expressions in the questionnaire, Feleky's sheet of names can also affect the judgement of the audience. As shown in the last column, the reference group, of Table 4.1 above, some of the expressions were at first unrecognizable to the viewer but are still attached a name from the sheet. Take Photograph 15 for example, the viewer failed to recognize the emotion at the first glance, but with the sheet's guidance, chooses 'attention' in the end. Notwithstanding this choice, it is still inadequate to declare that this expression has been successfully recognized by this viewer. For, if not provided with the sheet of names, he cannot grasp the meaning of the countenance and name the expression independently. In contrast, in Darwin's recognition experiments the viewers were asked to give their own answers without fixed choices. The differences between Darwin and Feleky in setting experiment questions had their own meaning and limitations which will be discussed in the next section.

#### C. Too subtle classification of the names

As can be seen from Table 4.1 above, the viewers' answers have a tendency to aggregate that the oftenest-answered names (usually two or three) of one emotion shared similar scores. For example, the top two answers to Photograph 62, 'contempt' and 'disdain', were marked 21 times each; and the top third and fourth answers, 'sneering' and 'haughtiness', were marked similarly with around ten times. All the four answers can be counted as successful recognition of the expression, indicating that such classification of names makes no difference to comprise the positive results. On the viewers' account, they usually chose the most familiar word to them, such as from 'contempt' or 'disdain'; 'sympathy' or 'pity', without dwelling on the subtle differences between them. The similar names of emotion play no part in Feleky's data analysis unless the cultural and educational backgrounds of the viewers are taken into consideration. However, such information was not provided by Feleky at all.

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<sup>192</sup> The following chapter will talk about Otto Klineberg's research, in which the factors of gender and education status are controlled in order to study the influences of cultural backgrounds.

#### D. Without an option of 'difficult to tell'

In those returned answers to Darwin's questionnaire, some of the items are left blank because the informants failed to observe the corresponding expressions among local races. However, in Feleky's experiment, although some photographs were hard to interpret, there was no option of 'skip' for the viewers to choose. In this condition, the answers cannot reflect the complexity in the recognition of the emotions. Otherwise, if more people can choose 'difficult to tell', the expression is then proved harder to recognize.

#### 4.4 Analysis of Feleky's results

To aid our understanding of the table, we now summate the correct answers and calculate the correct rate. Based on the data in Table 4.1 above, equivalent to its original form in Appendix B, the numbers of positive answers to the photographs are summated in Table 4.2 below. The first column is the photograph numbers and the incentive emotions to the expression. The second column is the types of positive answers including synonymous names, such as 'contempt' to 'disdain', 'pity' to 'sympathy' are counted as right answers to each other. The third column is the total number of right answers. Since there were one hundred viewers in all, so the number in the third column, if with %, also represents the recognition rate of the expression, that is, what percentage of viewers had successfully recognized the expression. According to this rate from high to low, the photographs in the first column are thus sequenced. The last column tells whether this expression has been properly recognized by the reference group (the Chinese observer).

Table 4.2 Summation of positive answers in Feleky's experiment

Photograph number and incentive emotions	Types of right answers	Numbers in total	Whether recognized by the reference group
22 agreeable surprise	Surprise 52 Wonder 12 Astonishment 10.5 Amazement 9	83.5	Yes
69 laughter	Laughter 40 Glee 17 Ecstasy 11 Merriment 10	78	Yes
77 religious feeling.	Reverence 25 Religious love, faith 25 Religious 15 Prayer 6	71	Yes
61 sneering	Sneering 33 Contempt 19.5	68.5	Yes

	Scorn 16		
55 disgust	Disgust 36 Repugnance 14 Annoyance 8 Sneering 8	66	Yes
33 horror	Horror 35 Terror 13 Fury 9 fright 7	64	Yes
62 contempt	Contempt 21 disdain 21 Sneering 10.5 Haughtiness 9.5	62	Yes
21 interest toward a child	Interest 23.5 Tenderness 10 Amusement 8.5 sympathy 7.5	49.5	Almost
38 physical pain	Physical suffering 31.5 Mental suffering 17	48.5	No
83 the first degree of suspicion	Suspicion 31.5 Distrust 6	37.5	Yes
44 fear	Terror 14 Fright 12 Horror 9.5	35.5	Yes
11 attention to an intellectual matter(quiz)	Attention 15 Interest 15 Reflection 5	35	No
15 attention to an object	Interest 22 Attention 13	35	No/attention (led by sheet of names)
52 vanity	Coquetry 19 Vanity 10	29	No
47 hate	Disgust 12.5 Disdain 8 Contempt 7	27.5	Almost
29 pity	Sympathy 14.5 pity 10	24.5	No
3 modesty	modesty22.5	22.5	No
48 sympathy	sympathy 9.5 Pity 5	14.5	No
9 breathless interest	Wonder 14	14	No
18 suspicion	Suspicion 6	6	No
51 rage	Annoyance 4	4	Yes
32 righteous anger	Dislike 4	4	Yes
31 determination	0	0	No
50 despair	0	0	No

As can be seen from the results, the expressions with high recognition rate (above 60) are usually strong expression of basic emotions, such as laughter (78), disgust (66), horror (64) and contempt (62). This finding is coincident with that in analyzing the Asian answers to Darwin's questionnaires (see Table 2.6 in Chapter 2). In addition to this, all the seven expressions with more than 60 positive answers (No. 22 to 62 in Table 4.2) are recognized properly by the Chinese observer who was not presented the directive names. In contrast, the thirteen expressions with less than 35 right answers (No. 11-50 in Table 4.2) are mostly (10 in 13) failed to be recognized by the Chinese observer. It implies that both the recognizable and unrecognizable expressions are approximately equivalent to the western and Chinese viewers. Among those highly-

recognizable expressions, Photograph 77 ‘religious feeling’ (Fig. 4.7 below) is special, which is the only one posed with a gesture. Though correctly interpreted by 71% viewers and the reference group, the high accuracy relied largely upon an understanding of the gesture rather than the facial expression.



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Fig. 4.7 Religious Feeling (Feleky 1922)

The Chinese observer interprets the gesture in Fig. 4.7 as ‘pray’, identical with most western viewers. The similarity between them in recognizing this gesture rooted in their cultural backgrounds — a uniform idea of ‘religious feeling’. Cultural factor in understanding emotion was later studied by Otto Klineberg in the 1930s, who will be the main focus of Chapter 5.

## **5 Feleky’s further experiment on emotional expression**

### Respiratory changes in emotions

Following the recognition experiment in 1914, as summarized above, Feleky studied respiratory movements of emotions in her master’s dissertation. This time she also took part in the experiment, with her breathing changes in several emotions recorded. The changes includes ‘(1) duration of inspiration as compared with that of expiration, (2) changes in the depth of amplitude, and (3) changes in the amount of work accomplished per unit of time’ (Feleky 1916: 1). In contrast to the one hundred and ten emotions photographed in the former experiment, the new test dealt with only six

‘primary emotions’: ‘pleasure, pain, anger, disgust, wonder and fear’<sup>193</sup> (p. 1). In Feleky’s view, respiratory movements during emotions should be separately interpreted from the accompanying facial movements and voices, which subdivided Darwin’s general description of emotions (p. 3). Seen from her results, most of the emotions are primarily expressed by facial movements and respiratory changes. Only in violent state of emotions will voices burst out, with turbulent respiration. This approach differs from Darwin in accounting for breathing and voices in emotions.

In the *Expression of Emotions*, most of the expressive behaviors concerned have to undergo an evolutionary explanation, either by applying the full formulation of the First Principle, Serviceable Associated Habits or its simpler, and core, form, habitual inheritance. A specific problem, sound accompanying the expression of emotions, is mainly exemplified with animal cases. For example, Darwin has mentioned that some birds can make sound by rubbing their feathers. The cases of human breathing and voices during emotions are comparatively rare<sup>194</sup>. There is only one human example explained by the first principle. It is after No. 10 recognition experiment on fear<sup>195</sup> that ‘whenever a person starts at any sudden sight or sound, he instantaneously draws a deep breath; and thus the contraction of the platysma may possibly have become associated with the sense of fear’ (Darwin 1872: 302). Apart from the general cause expounded with the first principle, the more anatomical problems, e.g. the respiratory and vocal muscles in this and other emotions, are almost resorted to the findings of Charles Bell and Duchenne, as mentioned in the foregoing Chapter 3. In contrast, Feleky’s experiment developed the physiological basis of emotional expression, enlightened by Charles Bell, James-Lange theory and Cannon<sup>196</sup>. By separately recording the three kinds of movements (facial, respiratory and vocal movements), Feleky explored the accompanying association between the respiratory movements and voices.

## 6 A book abundant in illustrations

Feleky’s last work on emotion was published as the *Feelings and Emotions* in 1922, exactly fifty years after the first publication of the *Expression of Emotions*. It in many ways imitates the structure and methods of Darwin’s book, with some innovative findings out of the foregoing experiments. However, in spite of those photographs being quoted afterwards, Feleky’s comprehensive achievements in the book had long

<sup>193</sup> Laughter and hatred are also examined in the end.

<sup>194</sup> As summarized in Chapter 1, animal examples are more often used to illustrate the three principles, especially with the problem of emotional voices.

<sup>195</sup> See Section 5.3 of Chapter 3.

<sup>196</sup> The master’s thesis of Feleky acknowledges Charles Bell’s *Anatomy of Expression*, Mosso’s study of fear (Mosso 1896: 164) and her contemporary American psychologist Cannon (1915).

been neglected. Otherwise, it may have been credited as the second landmark in the history of emotional science. In each of the subsections below, I will introduce its contributions especially in line with Darwin's theories and ideas.

### 6.1 A classification of mental behaviours

Darwin's concept of 'emotion' and 'feeling' is directly quoted from Spencer (1863: 138) that there is 'a clear distinction between emotions and sensations, the latter being "generated in our corporeal framework."', and both 'emotion' and 'sensation' belong to the larger domain of 'feelings' (Darwin 1872: 27). Apart from this citation, no other passage or footnote in the *Expression of Emotions* is devoted to literally discussing the connotations of these words. Darwin's main focus in the book is, rather, on the outward manifestation of emotion — the expressive behaviours. Feleky, in contrast, as reflected in the book title, *Feelings and Emotions*, does not follow the Spencer-Darwin concept but offers a new elucidation. She argues that feelings are the weaker state of emotion, and emotion is intensified feelings. In addition to this, some more items that are familiar to us when talking out mental states, like mood, passion and temperament, are also defined with their inter-associations. Table 4.3 below summarizes Feleky's category of these words in describing spirits. The first column is the names (items). The second column is their definitions and boundaries given by Feleky.

Table 4.3 The links and distinctions between mental items

Names	Description by Feleky
Mood	1. 'mood may represent the first degree of any emotion'. 2. 'and may last for hours or days' (Feleky 1922: 46).
Emotion	Lasts much shorter than mood: 'a few seconds or minutes' (p. 46).
Passion	1. 'Extreme emotions such as rage or fury are known as passions'. 2. 'The name passion is also given to any abiding interest to any mode of strong emotive response that is specific and <i>lasting</i> ' (p. 46-47).
Temperament	Four types of psychological temperaments: choleric, sanguine, melancholic and phlegmatic (p. 47).

These terms are then classified by Feleky into the fields of Psychology, as listed in Table 4.4 below. The first column is the fields in psychology. The second column is, according to Feleky, the problems should be concerned in each field. Feleky's category, because it is too general, does not help to structure her own thesis or enlighten later psychologists.

Table 4.4 Spiritual issues distributed to psychology fields

Fields of psychology	Terms
Psychology of feeling	Feeling, mood, passion, emotion, sentiment
Psychology of intellect/thinking	Sensation, perception, idea, association, thought
Psychology of will	Action, attention

## 6.2 Developments to Darwin's expressional study

### Justification for research methods

Notwithstanding their divergence in the definitions of 'emotion' and 'feeling', Feleky does agree with Darwin that emotions cannot be tested, so the manifestation of them provides the key to know our mental states (p. 47). Nonetheless, unlike Darwin's straightforward focus on the facial and gestural expressions of emotions, Feleky's book still begins with a theoretic discussion of emotion. A piece of Feleky's memory about consciousness is at first narrated to elicit the well-known James-Lange theory that emotion is a 'consciousness<sup>197</sup> of these bodily experiences' (p. 47). Her following discussion makes use of some of the research methods rarely and cautiously mentioned by Darwin. Sleep and dream, as a special state and phenomenon of consciousness, are discussed with testimonies from science, poems, dramas, psychoanalysis and experiments. At the end of this lengthy story in the first chapter, Feleky concludes the complexities of both the consciousness (thoughts and feelings) and its outer expression. She argues that paintings, sculptures and rhetoric are diverse mediums to express the composers' consciousness (p. 21). It is a theoretical backup to Darwin's trial in the *Expression of Emotions* to study paintings and sculptures.

### Separate the instinct from emotion

As mentioned in my Chapter 1, Darwin's thinking on emotion was accompanied by his long-time studies of the instinct, embodied in the 1838 notebooks and the earlier book-chapters on instinct. Feleky intends to clarify their relationship by citing from William James that emotion is a tendency to feel, while the instinct is a tendency to act (p. 5). The cause of the previous ambiguity between them is pointed to the different understandings of nervous mechanism that it is named 'reflex circuits' in physiology while the 'instinct' and 'emotion' in psychology. It explains the different roots of Darwin's three principles, as analysed with the sources of data in Chapter 1 of the present thesis. The third principle on nervous system for the most part is built upon the

<sup>197</sup> According to Feleky, consciousness consists of thoughts and feelings (p. 22).



findings of Müller, Spencer and other physiologists, fitting into physiological domain. In contrast, the first two principles mainly benefit from Darwin's psychological research, though the whole book is devoted to physiology and subsequent physiologists by Darwin himself<sup>198</sup>.

### Language problems

In Chapter IV of the *Feelings and Emotions*, the larger concept of language is subcategorized into speech, writing, natural language and conventional language. They have some intersectional parts. Natural language is defined as 'expressive cry, facial expression, characteristic bodily movements' (p. 70). Feleky notes that infants can 'speak' in gestural language before they acquire the ability of speech. The language (expression) of infants is all about natural language. Conventional language is steadily learned from the individual's social and cultural environment. To give an instance for conventional language, Feleky suggests that written or spoken words can express thoughts with a minimum of feeling. Feleky's discussion of language actually indicates the evolution of emotional expression from infants to adults.

### *6.3 Innovative findings with the use of photography*

Section 4 above has acknowledged us that Feleky pioneered in photographing introspectively-evoked emotions<sup>199</sup>. It is the first experimental testimony to Bain's hypothesis in 1865 that 'emotional feelings are revivable according to the laws of revival of mental states' (Bain 1887: 89; Feleky 1922: 77). In Chapter VI of the *Feelings and Emotions, Experiment in judgement of facial expression of the emotions*, Feleky keeps on examining whether the photographs produced can be properly recognized by the viewers, namely, to test the veracity of the revived emotions. The results are almost identical with those presented in her master's essay as analysed in Section 4 above. In summarizing the facial features in the hundreds of photographs, Feleky notes a fact that the pleasurable feelings are associated with expanded facial expression, while the unpleasant feelings accompany a contraction on the face (p. 79). This is an experimental and observational finding in response to Spencer's and Müller's assumptions of nervous mechanism which have been quoted by Darwin in

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<sup>198</sup> As argued in my Chapter 1, Darwin initially aims to study the expression of emotion by following physiological methods, like what Charles Bell and Duchenne had done. And, in the last paragraph of the *Expression of Emotions*, Darwin also recommends the book for later physiologists to further develop. Though with such aspiration, while due to his lack of anatomical knowledge and practices, Darwin's research integrates both physiological and psychological concepts, methods and data. The psychological dimension, especially leading to the second principle, is actually the most innovative part of the book.

<sup>199</sup> By reciting poems or retrospectively certain sceneries, e.g. sun, other beautiful vision or beloved ones, etc.

the *Expression of Emotions*. They three believe that emotion, which is largely divided into pleasure and pain, turns the nervous and organs in a direction to release themselves. Supplementing Darwin's observational evidence, Feleky's photographs further develops the rule that the pleasurable emotions expand facial expressions, while painful emotions make the facial organs contracted<sup>200</sup>.

Chapter V *Expression of Consciousness* investigates a problem as I find out in the previous Chapter 2 from Darwin's Asian answers — the different degrees of emotions<sup>201</sup>. In front of the camera, Feleky presented from the weakest to the strongest extents of amusement (to laugh), surprise, suspicion and sadness. The initial states of the four emotions are just attention to the camera with the emotions bearing in mind, as shown in Fig. 4.8 below. With the help of photography, Feleky solves one of the two main problems in studying the expression of emotion: the subtleness. As having been pointed out by Darwin and other predecessors, the difficulties in expressional research principally result from its fleeting and subtle characteristics. Most of the 17 emotions in Darwin's questionnaires are described in their violent states, such as 'laughter' rather than smile, so as to be easily identified by the amateur observers. Since the questionnaire is designed to test the presumed hypothesis on universality, subtle emotions are then not included to avoid more negative results. In contrast, Feleky in Fig. 4.8 below exhibits the incipient states of four emotions. By no means could Darwin describe so gentle (or subtle) states of emotions or relate their distinctions in words, let alone for those non-professional informants to observe.

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<sup>200</sup> It is confirmed by later physiologists that this law also work in bodily organs, see Mauss and Robinson (2009).

<sup>201</sup> Some of Darwin's informants had reported diverse degrees of emotions which were neglected in publication.



Fig. 4.8 The beginning of the mental states of 1. amusement, 2. surprise, 3. suspicion and 4. sadness (Feleky 1922: 82 Plate XX)

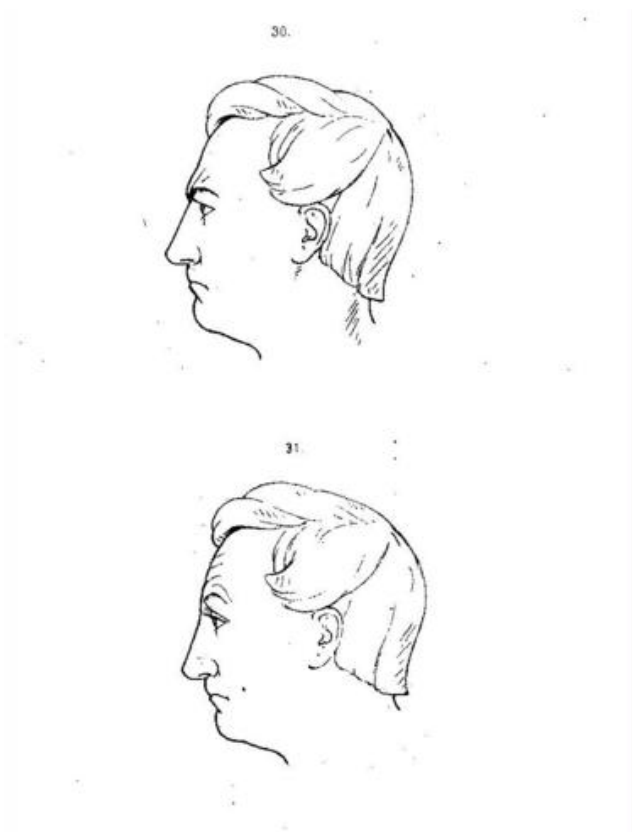
Feleky then applied recognition experiments to check the recognisability of the expressions in these four photographs. The results are 100% correct ratio (accuracy) in the judgement of amusement, 97% accuracy in judging surprise, 94% accuracy with suspicion and 91% accuracy with sadness (p. 82). The two emotions in the middle, surprise and suspicion, share the most similar incorrectness among the four. This similarity, according to Feleky, supports Charles Bell's assumption that 'the bodily expression of fear (the higher degree of surprise) and the mental expression of suspicion are the same' (p. 82). In conclusion, this experiment proves that any emotion, at least with these four kinds, even when it is in the fringe of attention (consciousness), will modify our mental states and actions (p. 82).

In this part we have identified Feleky's contributions to emotional science and the suggestive effects in her tests. One of the following testers in 1920s America assessed the effects of suggestions in his version of recognition experiments with false faces. A likewise quantitative analysis of his process and data in Part III will allow us to compare those with Feleky's work on real emotions. Such comparison in the

Conclusion part will improve our understanding on this piece of history.

**Part III: Recognizing false emotions immediately after Feleky: pure psychological approach**

Above we have seen the serial studies of human faces with the help of photography, and Feleky's recognition experiments in order to test the recognisability of those photographed expressions of emotions. In the 1920s, American psychology was abundant in recognition experiments<sup>202</sup>. In contrast to Feleky's photographs of introspective human emotions, some of the successors discarded real human faces but are interested in abstract faces, sketched by Darwin's contemporary German mediciner and writer, Theodor Piderit (1826-1898). Piderit's thoughts and observations on facial expression were published in 1867 as the *Mimik und Physiognomik*<sup>203</sup>. It is frequently cited in the *Expression of Emotions* in regard to some particular muscular movements, such as the frown (see Darwin 1872: 223) and the firm closure of the mouth (p. 237). However, Piderit's sketches of human faces enclosed at the end of the book seem untrustworthy to Darwin. Seeing Fig. 4.9 below, simply by changing some portions of facial organs, Piderit produced a series of abstract faces (Piderit faces in short).



<sup>202</sup> Such as Landis (1924, 1929); Sherman (1927), and so on. For an introduction to their works, see Nuttin et al. (2014); Ekman et al. (1972).

<sup>203</sup> For an introduction to Piderit and this book, see [Löffler \(2004\)](#).

Fig. 4.9 Piderit's drawings of abstract faces (Piderit 1867, Plate 30 and 31)

According to Piderit, these faces can express some kinds of emotions. His proposition should be examined by means of recognition experiments, which took place sixty years later. This part introduces the subsequent responses to the 'Piderit faces' in 1920s America immediately after the publication of Feleky's *Feelings and Emotions* (1922). There were even three stages and several psychologists involved in this short period. The first stage was in 1923 to build up a moveable facial model, the Boring and Titchener model, on the basis of the Piderit faces. The second stage encompassed the first trial to recognize the model with a group of people by Dallas Buzby in 1924. The third stage lasted three years from 1926, concerning the works of Buzby's colleagues: Ellen Jarden and Samuel Fernberger together in 1926, and mostly Fernberger himself in 1927 and 1928. They examined the results obtained in Buzby's experiments and further tested some other arrangements with the Boring and Titchener model. The main focus in this part is the third stage centered on Fernberger's three experiments, which will be explicitly discussed in Section 8. The first two stages, as the preliminary phase to Fernberger's work, are only briefly introduced in Section 7. A comparison between Fernberger's serial experiments will manifest how the results had changed his attitude to the Boring and Titchener model. In addition to this, we can also see the contrasts between Fernberger's and Feleky's versions of recognition experiments in the designs and operations.

## 7 Boring and Titchener model from Piderit's samples and its first practice

### 7.1 Building up the model

In order to demonstrate facial expression of emotions, two psychologists in Cornell University, Edwin Boring (1886-1968) and his project leader Edward Titchener (1867-1927)<sup>204</sup>, quoted and revised from the Piderit faces, or Piderit's 'geometry of expression' in their words, to make a head model in 1923 with its brows, eyes, the nose and the mouth moveable as shown in Fig 4.10 below. They selected from the samples of Piderit (1867) nine types of mouth<sup>205</sup>, five kinds of eyes, four kinds of

<sup>204</sup> Boring studied in Cornell University when Titchener was teaching there. After awarded a PhD in 1914, Boring joined Titchener's psychology lab (Boring and Lindzey 1967: 450). They noticed Piderit's research from the work of Titchener's PhD supervisor, the famous German psychologist and physiologist Wilhelm Wundt (1911). For more information about Boring and his tight relation with Titchener, see Boring and Lindzey (1967) and Steven (1973). For more information about Titchener and Wundt, see Boring (1929) and Hothersall (2004).

<sup>205</sup> Boring and Titchener add a 'plain/normal mouth' and enlarge the outline of chin in the 'open mouth' (Boring and Titchener 1926: 476-477).

brows and two kinds of noses. Through different combinations of these moveable parts, the model can theoretically demonstrate 360 kinds of expressions:  $9 \times 5 \times 4 \times 2 = 360$  (Boring and Titchener 1923: 474). As a result, a group of twenty-four combined faces are selected and photographed as the Boring and Titchener model. The criteria in their selection, though was not clearly addressed by Boring and Titchener, can be inferred from their statement that the contradictory expressions are excluded. That is to say, the twenty-four artificial expressions in the final set are chosen because they approximate to natural human emotions. However, this set of selected faces with the model are still far from the natural expressions of emotions posed by human being as in Feleky's experiments. At least, none of them can display the subtleness of emotions as posed by Feleky in Fig. 4.8 above.

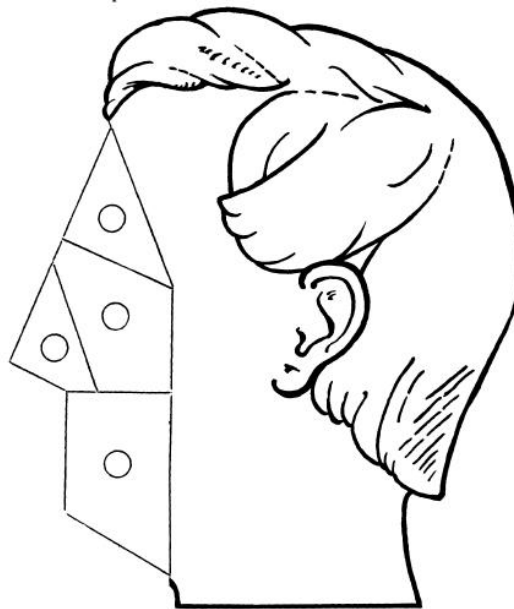


Fig. 4.10 Boring and Titchener model (Boring and Titchener 1923:472)

### *7.2 First practice with this model: Buzby's recognition experiment*

Dallas E. Buzby (1889-1973) at University of Pennsylvania tested the freshly-composed Boring and Titchener model with recognition experiment in 1924. Six arrangements were selected from the model's twenty-four faces: anger, dismayed, horrified, disdainful, disgusted and bewildered<sup>206</sup>. Six sheets of paper, each containing a photograph of one expression, were one by one presented to 716 students in graduate and undergraduate schools for them to choose a corresponding description from 18

<sup>206</sup> We can see that all the six selected expressions were depressing or negative emotions. Buzby did not explain his criteria of such choices but only assumed that they were 'typical faces' (Buzby 1924:602).

terms of emotions<sup>207</sup> (Buzby 1924: 602).

The results are disappointing. Only the ‘horrified’ expression among the six is recognizable without significant scatter. Buzby’s experiment is not to test the ability of the viewers to recognize emotional expressions, but, instead, to test the naturalness of the faces assembled in the Boring and Titchener model. The results show that, except for the expression of ‘horrified’, most of the faces are unnatural, or say they are far from natural human emotions. Notwithstanding the great scatter in the results, Buzby has made some interesting findings by separately recording the answers from two genders and different education levels. Comparisons between their correct answers find that male participators scored 3.5 percent lower than the females in the judgment of correct answers; and the students who received more psychological trainings scored also 3.5 percent lower than those early beginners. In so far, no substantial conclusion can stand on such contrast, because there are some uncontrolled factors in the experiment, such as the ages and ethnic backgrounds of the participants<sup>208</sup>. Despite that, Buzby still contributed to the school of recognizing emotions, if was not the first one, by taking the gender and cultural variables into account in analyzing the results.

## **8 The maturity and ending of the model in Fernberger’s three experiments**

In response to Buzby’s experiment with the Boring and Titchener model, his colleague at University of Pennsylvania, Samuel W. Fernberger (1892-1942), from 1926 conducted serial experiments following the same procedures of Buzby (1924) and expanded the test onto the other unexamined expressions in the Boring and Titchener model. The most creative finding in his research is that he tested the suggestive effect of the introductory questions presented to the viewers, which, in practice, had endorsed the non-suggestive introductions employed by Feleky (1914, 1922) as mentioned in Part II above.

### *8.1 Jarden and Fernberger’s first experiment*

Ellen Jarden and Fernberger participated in the first experiment in 1926 reduplicating the procedures of Buzby (1924). Their aim, as expressed in the title of the published report, was to investigate the ‘effect of suggestion on the judgment of facial expression

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<sup>207</sup> All the names of emotions were copied from Boring and Titchener (1923). The eliminated six terms were passive, very displeased, deeply thoughtful, unpleasant olfactory attention, pleasant unpleasantness, displeased and thoughtful. From his screening the terms of emotions, it can be inferred that he obliterated the complicated (longer names) and contradictory expressions (such as pleasant unpleasantness) listed in Boring and Titchener’s model.

<sup>208</sup> These factors were taken into consideration by Klineberg in the 1930s, who will be introduced in the following chapter.

of emotion' (Jarden and Fernberger 1926: 565). They believe that the introduction in Buzby's experiment — 'the subjects were asked to choose the best descriptive term from a list' of 18 terms of emotions — was non-suggestive<sup>209</sup>. Though admitting the large scatter of judgements obtained by Buzby, they still credit the value of the Boring and Titchener model that it 'has a much more valid demonstrational value than these (Buzby's) results would indicate' (p. 565). In their responding experiment, Jarden and Fernberger used the same six expressions applied in Buzby's research and followed almost the same procedures, nothing but the degree of suggestion in the introductory questions increased.

The experiment has two sections representing two levels of suggestive methods and effects. In the first section (lower suggestive level), the viewers were given the six faces and with each of them the name of the emotion it was supposed to express. They were required to record: a. whether the face represented the emotion; and b. the degree of relevancy between the faces and the names describing them, using the following terms 'poor', 'fair' and 'good' (p. 566). In the second section of the experiment (higher suggestive level), the Boring and Titchener model was assembled in the front of the viewers, with verbal explanations of the separate portions of the facial model: the diverse types of brows, eyes, noses, mouths and their meanings in representing the expressions of emotions. The results obtained were then compared with the ones in Buzby (1924) to form a table. Table 4.5 below lists the data. The first column is the six expressions from the Boring and Titchener model. The second column is the percentages of correct answers received in Buzby's experiment. The third and fourth columns write Jarden and Fernberger's corresponding results collected in the first and second sections respectively.

Table 4.5 The Percentages of Correct Judgments (Jarden and Fernberger 1926: 566), with a correction to the original table<sup>210</sup>.

Expressions	Buzby's results	Low suggestive level (Section 1)	High suggestive level (Section 2)
Anger	2%	36%	56%
Dismayed	6.4%	80%	86%
Horrified	61.3%	98%	95%

<sup>209</sup> In a strict perspective, the list of terms provided for the viewers to choose from is still suggestive to some extent if compared to the introduction applied in Darwin's recognition experiments that the viewers were asked to describe the expressions with their own words.

<sup>210</sup> Jarden and Fernberger had made a mistake in calculating the percentage of correct answers to the expression of 'horrified' in the column of Buzby's experiment. They wrote 63%, which was actually 61.3% from 439/716 (Buzby 1924:603).



Disdainful	37%	98%	98%
Disgusted	52.65%	99%	99%
Bewildered	36.45%	96%	96%

Table 4.5 above shows that, in Jarden and Fernberger's test, though with two suggestive levels of introduction, the correct judgements to 'anger' and 'dismayed' are still far from those devoted to the other expressions. This disparity indicates that these two expressions are the most unnatural ones among the six faces chosen by Buzby (1924). The more satisfied data about the other four expressions cannot, however, evidence the far-fetched argument of Jarden and Fernberger that the other four expressions have appropriate relevancy to the emotional terms attached to them. Their argument was an attempt to rectify the inadequacy of the Boring and Titchener model in recognizing emotions, but the increased suggestive levels in their experiment had disrupted, if not only weakened, the logical rightness in their argument. My critique is based on an analysis of the original data in their experiment — the answers to the 'a' and 'b' questions. I suggest that the 'No' and 'Poor' answers together constitute the negative answers, while the 'Good' answers are the only source for positive answers. According to this classification, Table 4.6 below delivers the percentages of negative and positive answers obtained in the first and second sections. The first column is the six expressions. The second column contains the negative and positive answers asked by the low suggestive level question in Section 1 of the experiment. The third column notes the corresponding results obtained with the high suggestive level question asked in Section 2.

Table 4.6 The percentages of 'No+ Poor' and 'Good' answers, revised<sup>211</sup> from (Jarden and Fernberger 1926: 568)

Expressions	Low suggestive level (Section 1)		High suggestive level (Section 2)	
	No + Poor	Good	No + Poor	Good
Anger	92%	2%	79%	5%
Dismayed	52%	13%	31%	18%
Horrified	9%	69%	17%	60%
Disdainful	9%	64%	9%	64%
Disgusted	7%	70%	8%	68%
Bewildered	15%	45%	13%	49%

Reading from Table 4.6 above, for all the six expressions, their positive recognition

<sup>211</sup> In the original table of Jarden and Fernberger, the 'no' and 'poor' answers are separately listed in two columns, while they are added together here to show the overall number of disagreeable answers.

rates, 'Good' answers, in the two sections are under 70%. Especially low are the expressions of 'anger' and 'dismayed'. Even with the high suggestive level in Section 2, their positive answers did not increase much — still under 5% and 20% respectively. Meanwhile, their negative recognition rates, 'No'+ 'Poor' answers, remained much higher than the average numbers of the six in both the two sections. In light of such low percentages of positive answers and so high percentages of negative answers in 'anger' and 'dismay', their inadequacy (unnaturalness) in demonstrating the emotions as termed in the Boring and Titchener model can be determined, if not including the expression of 'bewildered' as well, which scored less than 50% of 'Good' answers and higher than 15% of negative answers in Section 1. Thus, Jarden and Fernberger's belief in a satisfactory performance of the whole set of the six expressions proves infeasible at least in these three expressions. Furthermore, we should bear in mind that the two suggestive levels in the two sections are both higher than the original experiment of Buzby (1924) to result in more positive answers. In sum, the new test's results cannot overturn the conclusion in the former test. The data received in both the 1924 and 1926 experiments suggest the unnaturalness (inadequacy) of the Boring and Titchener model in displaying human emotions.

Jarden and Fernberger too, as Buzby (1924) did, separately recorded the answers from the beginning and sophisticated students in psychology. The results endorse Buzby's finding, as aforementioned in Section 7, that the sophisticated students in psychology tended to give negative judgements on the adequacy of the expressions.

### *8.2 Fernberger's second experiment with three suggestive levels*

Fernberger's second responding experiment to Buzby (1924) took place in 1927. This time six other expressions were chosen: the profile of 'quizzical', 'amazed', 'contemptuous', 'attentive', 'stubborn' and 'reverential'. Like Buzby (1924) did, the long and complicated names in the Boring and Titchener model were still not selected. The main procedures are just the repetition of Buzby (1924) and the first experiment of Jarden and Fernberger (1926). The differences are that the profiles were for three times presented to the same group (with one month interval) at three suggestive levels respectively. The first suggestive level is to select from a list of terms as used by Buzby (1924). The second level is the same as the first section in the 1926 test that the viewers were given a name of emotion and asked to judge the adequacy of the expression in displaying the emotion. The third level is the same as in the second section above that the facial portions of the model were vocally introduced and assembled in front of the viewers. The operations at the three levels are named Procedure 1, 2 and 3. The results obtained in these three procedures are calculated and

listed in Table 4.7 and 4.8 below. Table 4.7 contains the percentages of right selections in Procedure 1. Table 4.8 is formatted in the same way of Table 4.6 above, comprising the answers occurred in Procedure 2 and 3.

Table 4.7 The percentages of right selections in Procedure 1<sup>212</sup>

Expressions	Percentages
Quizzical	19.5%
Amazed	13.25%
Contemptuous	42.6%
Attentive	17.8%
Stubborn	48.3%
Reverential	49.2%

Table 4.8 The percentages of answers in Procedure 2 and 3, revised<sup>213</sup> from (Fernberger 1927: 568)

Expressions	Answers in Procedure 2		Answers in Procedure 3	
	No + Poor	Good	No + Poor	Good
Quizzical	50.4%	9.8%	28.9%	17.8%
Amazed	31.3%	33.5%	38.3%	26.5%
Contemptuous	5.6%	84%	5.2%	78.3%
Attentive	44.8%	21.5%	19.4%	43%
Stubborn	14.1%	56.3%	14%	52%
Reverential	35.1%	38.5%	37.1%	28.5%

Comparing the ‘Good’ answers between Procedure 2 and 3, Fernberger observed the increase in ‘the number of good judgements of the worst faces (Quizzical and Attentive)’ and the decrease in the percentages of good judgments to ‘the other four faces (Amazed, Contemptuous, Stubborn, and Reverential)’ due to ‘the complete analysis of the face’ (Fernberger 1927: 165). It shows that the increasing suggestive level from Procedure 2 to 3 shed different effects on recognizing the six expressions. To put it in another way, it proves the non-uniformity between the faces in response to the change of suggestive levels, implying that some of the faces in the Boring and Titchener model are more irrelevant to the emotional terms attached to them.

<sup>212</sup> The original table of Fernberger (1927) only lists the numbers of various judgements (p. 164). On the basis of his data, the percentage of correct answers is calculated with the correct number of judgements being divided by the overall number of the viewers (770 as given in Procedure 1).

<sup>213</sup> In the original table, the ‘no’ and ‘poor’ answers are separately listed in two columns. They are added together here to show the overall number of disagreeable answers.

### 8.3 Fernberger's third experiment: a test with 'false suggestion'

Fernberger in 1928 published his final experimental response to Buzby (1924). In this experiment the same six expressions of Buzby (1924) were chosen to test the impact of 'false suggestion' upon the viewers' recognition. It too consists of three procedures: Procedure A, B and C. Procedure A repeated that of Buzby (1924) and Procedure 1 in 1927 to select from eighteen descriptive terms. The percentages of correct selections are listed in Table 4.9 below. The first column is the six expressions. The second column is the percentages of right answers.

Table 4.9 The percentages of correct judgments<sup>214</sup> in Procedure A

Expressions	Percentages
Anger	2.25%
Dismayed	4.2%
Horrified	53.3%
Disdainful	31.53%
Disgusted	43.09%
Bewildered	27.63%

The result is 'a very close confirmation of the Buzby results with these same faces' that 'indeed the rank order of correct judgments is exactly the same in both cases: Horrified and Disgusted are highest; Disdain and Bewildered intermediate; and Dismayed and Anger are the lowest' (Fernberger 1928: 563).

#### Procedure B and C

The other two procedures for the most part cloned those in 1927. In Procedure B, parallel to Procedure 2 in 1927, the viewers were given an expression and an emotive term to judge their relevancy. And, in Procedure C, parallel to Procedure 3 in 1927, the various portions of the Boring and Titchener model were further explained and assembled before the viewers. Nonetheless, this time, in order 'to see how well one could 'get across false suggestion', it was used in Procedure B and C three terms from the same emotional categories (with same meaning but differing only in degree), and three terms in different emotional categories as the substitutes for the emotive terms

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<sup>214</sup> The original table of Fernberger (1928:563) only lists the numbers of various judgements. The percentage of correct selections is calculated here with the correct numbers of judgements divided by the overall number of viewers (666 provided in Procedure A).

given by Boring and Titchener (1923) (Fernberger 1928: 563). For the same emotional categories, classified by Fernberger as the lower degree of false suggestion, the expression of ‘dismayed’ is named ‘quizzical’; the ‘disgusted’ face but named as ‘contemptuous’; the expression of ‘disdain’ with the name of ‘displeased’. For the different emotional categories, defined as the stronger degree of false suggestion, ‘we called the Anger face ‘Pleased’; the Horrified face ‘Attentive’<sup>215</sup>; and the Bewildered face ‘Reverential’ (p. 563).

Table 4.10 The percentages of answers in Procedure B and C, revised<sup>216</sup> from (Fernberger 1928: 565)

Expressions and emotive terms given	Procedure 2 (given the name)		Procedure 3 (besides given the name, further analysed and assembled)	
	No + Poor	Good	No + Poor	Good
Anger- pleased	70%	6%	51%	16%
Dismayed- quizzical	26%	31%	17%	47%
Horrified- attentive	90%	5%	70%	11%
Disdain- displeased	23%	39%	10%	61%
Disgusted- contemptuous	5%	83%	5%	80%
Bewildered- reverential	30%	29%	18%	45%

There are three false suggestions here, ‘quizzical’, ‘contemptuous’ and ‘reverential’, used in 1927 as true emotional terms. By comparing the data in the 1927 experiment (see Table 4.8) and those here (in Table 4.10), Fernberger noticed that these names fitted better with the contradictory faces than with their original ones. For example, in 1927 the ‘Quizzical’ face received 50.4% ‘No+Poor’ answers and 9.8% ‘Good’ remarks, while in 1928 when attached to the face of ‘Dismayed’ it received 26% negative answers and 31% ‘Good’ remarks. That is, from the 1927 to 1928 experiments, the ‘Quizzical’ face saw a 48% decrease in its negative answers and a 210% increase in the positive results. Fernberger attributed such changes to the greater

<sup>215</sup> In Darwin and many other scholars’ view, the expression of ‘horrified’ is the violent state of attention (See Section 5 of my Chapter 3). To Fernberger, however, they are regarded as contradictory expressions.

<sup>216</sup> There is an obvious mistake in the original table that the column names of ‘False suggestion’ and ‘True face’ are reversed. Despite that, in the original table, the ‘no’ and ‘poor’ answers are separately listed in two columns, while they are added together here to show the overall number of disagreeable answers.

enthusiasm of the experimenter in trying to promote the false suggestions than the true ones (p. 566).

Fernberger's conclusion this time seems fairer in commenting on the quality of the Boring and Titchener model in recognition practices. He for the first time admitted that 'The results for the Piderit model, when no suggestion was given, showed a wider scatter with little validity of correct judgement in the interpretation of expression of emotion' (p. 567). With the impact of suggestions, either true or false, that were utilized in his series of experiments, he reported that 'These results seem to indicate that the perception of emotional states in others by their expression is of the nature of social meanings and that they are much more dependent on the stimulus-attention than anything characteristically intrinsic in the facial expression or reaction' (p. 568)<sup>217</sup>. This aspect of the problem was viewed by him as 'may be of some importance in criticizing the theories of the followers of the Darwinian school of the emotions' (p. 568).

### **Conclusion**

Part I to III above have introduced the research on four photographed expressions in chronological order, with a keen focus on the recognition experiments around 1910s America. When Darwin published the *Expression of Emotions*, if we had asked him what his dreams were for the future of this new science he had invented, and in particular the future of recognition experiments, one thing I am sure is that he would hope the students of him follow an evolutionary routine, which, as I have argued in Chapter 1, was the fundamental creed and argumentation throughout his academic life, as revealed from his serial big volumes. However, this evolutionary creed had rarely been mentioned by those scientific members introduced above, while, ironically, it was utilized by the personnel physiognomist Blackford to justify her racist argument — the last thing Darwin would like to see. Darwin might foresee the persistent role of photography in conveying the studies of human faces, but he might not hope for its use in documenting racial diversities by Mantegazza, as conflicting with his belief in racial universality of expression. In contrast to Mantegazza's and Blackford's emphases on racial differences or even hierarchy, Feleky's emotional study in the school of psychology was closer to Darwin's own agenda, especially when conducted in the physiological trend led by the James-Lange theory. Feleky's *Feelings and Emotions* consists of both a Ladd-like philosophical narration and an experimental approach.

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<sup>217</sup> Or as historian Argyle (1969) put it, Fernberger found that 'if there were conflict between facial expression and situation, judges followed situation' (Argyle 1969:157). The 'situation' here or the 'stimulus-attention' used by Fernberger meant the true or false suggestions that would affect the viewers' judgement.

Feleky had developed physiological attributes of emotional expression by examining the chemical and physical changes, like voices, during emotions.

Compared to Darwin's use of Duchenne-galvanized photographs, Feleky's serial works rely much more on photography, evinced in her first test, master's dissertation and the *Feelings and Emotions*. As introduced in the foregoing Chapter 1, the photographs and wood engravings in the *Expression of Emotions* are for either demonstrating or verifying the pre-existed expressional principles. That is to say, the pictures in the book mainly serve to illustrate Darwin's theories, e.g. the expressional principles, and to improve the vividness or credibility of the book. In contrast, Feleky's *Feelings and Emotions* is centred on those photographs that most of its findings derived from the experimentations on them. In this respect, we can grasp that photography played a much bigger role in Feleky's research than in the *Expression of Emotions*. It was the scientific cornerstone of the former while the ornament to the latter.

The recognition experiments after Feleky, as in Fernberger's serial tests with the Boring and Titchener model, followed a pure psychological approach, bearing no physiological consideration. Feleky's recognition experiments were part of her larger scheme to record the physical changes during emotions — her initial aim was to study the correlation between facial and respiratory movements in emotions. While, the practices with the Boring and Titchener model had nothing to do with this physiological trend. This shift in the small community of recognition experiments marked the institution of pure psychology seeing its divorce from physiological concern.

Historically tracking the photographic studies of the four expressions offers us a view that the technical advances in photography did not boost emotional research accordingly. The fast-capturing function which was already matured in Taylor's time was not well-utilized by those business consultants. The photographs taken by Feleky were not better in resolution or speed than those made by Mantegazza. It was the experimenters who played the major role in evolving emotional science. For example, Fernberger's last recognition experiment in 1928 even required no photograph but was demonstrated by moveable facial model. That is why a detailed summary of Darwin's recognition practices is necessary in the preceding chapter.

It also seems that those who concentrated on physical features (of head and countenance) tended to include questions of race as a central part of their research agenda, especially among anthropologists. Two Italian measurers of skull capacity,

Mantegazza and Lombroso, announced superiority of white races in the late nineteenth century. Following them in America, the ‘character expert’ Katherine Blackford, with a particular interest in the nose, published her racial comparison book *Blondes and Brunets* in 1916. During that time, tones of books and articles on racism came off the press under the names of some kinds of ‘science’. Some psychologists attacked racism by attributing racial differences to cultural influences. A crucial beat to this trend, ending its dominance in governmental policies, was given by American social psychologist Otto Klineberg, who had also carried on Darwinian method to study expression — Method 8 Literary approach. The trend and anti-trend of Scientific Racism will be introduced in the following chapter, as the context for Klineberg’s contribution to the study of expression in cultural aspect.



## **Chapter 5 The Cultural Variation of Expression in Klineberg's Literary Study**

By examining Darwin's questionnaire data in Chapter 2 we have found that there are a significant number of reports on how the expressions of natives of different countries were affected by their sociocultural environments. For example, more civilized tribes learned to hide their emotions. However, these findings about cultural variations had been discarded by Darwin in order to maintain his hypothesis on universality. After its suppression in the *Expression of Emotions*, it took a further half-century before the cultural interpretation of expression was scientifically studied. In the 1930s, Otto Klineberg – a Canadian-American social psychologist – investigated the impact of culture on expression in a selection of human races simply by reading the native literature of different races. Klineberg's concern with cultural distinctiveness was not a side interest, but a part of his lifetime endeavour to fight the trend of Scientific Racism. This chapter makes three novel contributions to the scholarship on Klineberg. The first is to highlight the huge influence that the famous American anthropologist Franz Boas had on Klineberg's career and research through an examination of their correspondence and a comparison of their research methods. The second is its finding that, inspired by Boas, Klineberg was the first to reveal the inaccuracy of intelligence-testing reports that purported to show that certain races were less intelligent than others, thus revealing their racist bias. The third achievement is to summarize the core questions in Klineberg's literary study of expression, and to answer the question of why the method he used was not carried forward by later scholars. Following this agenda, the chapter unfolds in three parts.

The social and intellectual backgrounds for Klineberg's research were the controversies concerning racism at the turn of the Twentieth Century (around 1900, the same hereafter), and these will be discussed in Part I *Wider social and intellectual changes from Darwin to Klineberg*. This section shows three stages through which Scientific Racism developed – Galton's Eugenics, Intelligence Testing, and Scientific Racism – and discusses the central role of intelligence testing in its growth. In the *Descent of Man*, Darwin mentions that a side-effect of well-intentioned humanitarianism was to produce 'asylums for the imbecile, the maimed and the sick', for fear that they may reduce the average ability of human stock (Degler 1991: 41). Darwin's cousin, Francis Galton, converted this worry into action, with the aim of (a) enlarging the population that have desired traits (in intelligence and health) and (b) reducing the population that have undesirable traits. Galton coined the word 'eugenics' and launched the movement. With respect to the eugenic movement, two points are

relevant to our discussion here. First, it was the initial step in the trend towards Scientific Racism, with Galton himself starting to advocate racist policies in the 1870s. Second, the development of the eugenic movement boosted the use of the intelligence test. Galton was the first to study human intelligence using a statistical method, and later Alfred Binet invented the first intelligence scale, which was to become a popular technique in psychology. When the same races were frequently reported as having lower intelligence scores through these tests, Scientific Racism became formally established.

Klineberg was the first researcher in this area to challenge some of the received wisdom on how these ‘lower’ races fared in intelligence testing. His research and his antiracist position are introduced in Part II *Klineberg’s study and the furtherance of racial equality*. This part shows how Klineberg imported a Boasian method to make original contributions to psychology and to generate social reforms. After being enrolled at Columbia University, Klineberg encountered the race debate within the Department of Psychology. But, influenced by the sociocultural accounts of racial features in Boas’ anthropological classes, he chose the antiracism side. Boasian influences on Klineberg’s career can be perceived in two ways: Boas not only supervised Klineberg’s PhD project regarding racial problems, but also offered him his first job. With regards to the first aspect, I will show how a groundbreaking article by Boas correlated with Klineberg’s research. To establish the second aspect, the personal correspondence between the two is, for the first time, consulted.

Finally, Part III *Klineberg’s literary study of expression* analyses Klineberg’s 1938 expressional study, which relies heavily on literary sources, like Darwin’s eighth method. However, the key questions in this article were neither summarized by the author nor referred to by later scholars. This summary is undertaken on Klineberg’s behalf in this part. In the concluding section, I consider why a similar report has not been seen in the history of psychology.

### **Part I: Wider social and intellectual changes from Darwin to Klineberg**

Galton’s Eugenics — Intelligence testing — Scientific Racism

#### **1 The era of modern eugenics with Francis Galton**

‘Consequently the appearance of your *Origin of Species*’ formed a real crisis in my life; your book drove away the constraint of my old superstition as if it had been a nightmare and was the first to give me freedom of thought’ (Galton 1869a).

The concept of eugenics can be traced back to ancient civilizations, while the initiation of modern eugenics in the late Nineteen Century is commonly credited to Francis Galton (1822–1911), Darwin’s half-cousin. As quoted above, Galton wrote to Darwin to express how much he had been influenced by the latter’s evolutionary ideas. After reading the *Origin of Species*, Galton became interested in hereditary variations and decided to apply the study to human stock. In the 1860s, he published an article, *Hereditary Talent and Character* (1865) and a book, *Hereditary Genius* (1869), in which he was the first to study the heredity of talents statistically. In the *Hereditary Genius*, he writes:

‘I propose to show in this book that a man’s natural abilities are derived by inheritance, under exactly the same limitations as are the form and physical features of the whole organic world. Consequently, as it is easy, notwithstanding those limitations, to obtain by careful selection a permanent breed of dogs or horses gifted with peculiar powers of running, or of doing anything else, so it would be quite practicable to produce a highly gifted race of men by judicious marriages during several consecutive generations’ (Galton 1869b: 1).

Thus, Galton is contending here that talents and intelligence are hereditary traits rather than things determined by environment (including education). He thinks that we could improve the ‘quality’ of human races by means of selective marriages between individuals – an idea that is at the core of modern eugenics. Immediately after publication, a copy of the *Hereditary Genius* was sent to Darwin. In response, Darwin congratulated his cousin with tacit reservation, admitting that he was only able to read the first fifty pages.<sup>218</sup> There are three possible reasons why this book did not suit Darwin’s taste. First, the statistical method permeating the book impeded Darwin’s comments. Second, the book is based on an ethnic survey of ‘fairly eminent men – namely, the Judges of England from 1660 to 1868, the Statesmen of the time of George III, and the Premiers during the last 100 years’,<sup>219</sup> and its aim was to ‘produce a highly gifted race of men by judicious marriages’ (Galton 1869b: 1). In contrast, Darwin was familiar with and often expressed amazement at the achievements of ‘the Negro’ and other ‘less civilized’ races, e.g. with respect to their artworks. In replying to Galton’s emphasis on hereditary nature by denying the influence of nurture, Darwin writes: ‘I have always maintained that, excepting fools, men did not differ much in

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<sup>218</sup> The basic argument of Galton’s eugenics is that ‘mental and physical features [are] equally inherited’ (Freeman 1956). The heredity of intelligence and the measurement of it constitutes the theoretical and practical basis of Galton’s work.

<sup>219</sup> The 1869 book expands on the survey of the Judges of England from 1660 to 1868, as published in the preceding article of 1865.

intellect, only in zeal and hard work' (Darwin 1869a).

Two years later, in the *Descent of Man* (1871), Darwin responds to Galton's arguments in a similar way. In the section entitled *Natural Selection as affecting Civilised Nations*,<sup>220</sup> Darwin mentions the works of Wallace, Galton and W. R. Greg. These three all maintain that civilization may interrupt the process of natural selection and lead to the deterioration of human stock. Darwin's response to this argument is clear: 'we must bear without complaining the undoubtedly bad effects of the weak surviving and propagating their kind' (Darwin 1871: 169). As mentioned in Chapter 1, having come from an antislavery family, Darwin treats the global human races equally in the *Expression of Emotions*. Darwin's pursuit of racial universality is also evidenced by the publication bias in his selective handling of the questionnaire data, as discussed in Chapter 2. After the *Expression of Emotions*, Darwin even extended the uniformity to the flora kingdom. Throughout his life, Darwin had never openly supported eugenic practices, neither at the national level (in relation to levels of intelligence) nor at the international level (in relation to 'inferior' human races). Conversely, in the 1870s, Galton began to advocate racist policies in the British colonies. In 1873, he wrote to *The Times* to ask them to publish a proposal that would make: 'an encouragement of the Chinese settlements at one or more suitable places on the East Coast of Africa, in the belief that the Chinese immigrants would not only maintain their position, but that they would multiply and their descendants supplant the inferior Negro race' (Galton 1873). The editor, Malcolm Sproat, rejected his proposal, commenting that, 'Mr. Galton's proposal to introduce the Chinese into Africa does not seem to be based on much well knowledge of these people' (Sproat 1873).

After the failed proposal, Galton further systemized the eugenic ideas with a statistical method and focused his research on the improvement within one human race. The word 'eugenics' was coined in 1883,<sup>221</sup> and Galton defined it in 1904 as 'the science which deals with all influences that improve the inborn qualities of a race; also with those that develop them to the utmost advantage' (Galton 1904: 68). Through a series of publications and a number of national and international conferences, the new subject of eugenics had soon firmly established itself.<sup>222</sup> Moreover, some European countries began implementing eugenic policies, such as asylums and sterilization. However, Galton never succeeded in devising a practical technique or model for testing human intelligence. After thirty years, the European eugenics movement began

<sup>220</sup> In Chapter V *On the development of the intellectual and moral faculties during primeval and civilised times*.

<sup>221</sup> The word 'eugenic' was first used in Galton's 1883 article: 'Inquiries into Human Faculty and Its Development'.

<sup>222</sup> In 1908, Galton founded the Eugenics Society of Great Britain. The year after, he started a monthly journal called *The Eugenics Review*.

to decline in the 1930s in response to the Nazi co-option of it for justifying the Jewish Massacre. However, eugenic policies continued to be implemented for much longer in the United States. Apart from being more distanced from the Nazi atrocities, another possible reason for this may have been the already established widespread use of intelligence tests in America. Before Section 2, which introduces this technique, it will first be useful to look at Galton's trial methods for 'measuring' human intelligence.

### Galton's biographical and questionnaire methods

In the *Hereditary Genius* (1869), Galton proposes the core of modern eugenics – that, (1) genius is an inherited trait, and (2) the human race can be improved by selecting parent stock. His research afterwards centred on these tasks. As mentioned above, the *Hereditary Genius* (1869) derived from a series of ethnic surveys on 'eminent men in the last 100 years', including the 'kindred of the most illustrious Commanders, men of Literature and of Science, Poets, Painters, and Musicians, of whom history speaks' (Galton 1869b: 2). In the first survey that he performed in this area, Galton recognised the behaviours and characters of eminent men through reading their biographies, and these research subjects and the biographical method continued to be used in his subsequent inquiries. The second survey was published in 1874 as a book named the *English Men of Science: Their Nature and Nurture*. The title suggests that it only enquires into the men of science, and one year before its publication, Galton distributed questionnaires, entitled *Inquiry into antecedents of scientific men*, to the fellows of the Royal Society. The questionnaire included seven pages and hundreds of questions, asking respondents about the characteristics of their family members and ancestors. Unlike Darwin's expressional query, not only requiring a definitive 'yes' or 'no' answers but also encouraging instant observations that are fresh from memory, Galton's unnumbered questions, for the most part, are complicated and biographical, needing lengthy descriptions and reminiscences.<sup>223</sup> These include, for instance, 'Are any peculiarities either very uniformly developed, or very irregularly among yourself, your brothers and sisters, or in the family of your father, or in that of your mother?' (Galton 1874: 265); and 'How long were you at small schools, large schools, universities, and at what ages? Name or place of school or university, and chief subject taught there' (p. 266).

In this intricate biographical query, one quantitative question asks for a physical feature: the 'measurement round [the] inside rim of your hat' (p. 264). Fancher (1983) has pointed out that, 'like many of his contemporaries, Francis Galton believed in a

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<sup>223</sup> Though lengthy description is encouraged in the 'instruction'. Darwin's questionnaire formally asks 'Is...?' rather than 'What...?' questions.

positive relationship between head size and intelligence’ (p. 227). This question is most likely the earliest published example of Galton’s attempt to link human intelligence with a physical trait. The Galtonian approach to measuring intelligence then burgeoned in the decade that followed. In 1884, Galton established an Anthropometric Laboratory to measure the customers’ head sizes, fingerprints, reflex intervals and muscle grips. Gathering these data, Galton and his disciple, Karl Pearson,<sup>224</sup> attempted to identify a correlation between these observable traits and the degree of human intelligence. However, the results turned out to be disappointing. In 1901, Galton finally admitted their failure and began to doubt his earlier efforts: ‘The non-correlation of ability and size of head continues to puzzle me the more I recall my own measurements and observations of the most eminent men of the day’<sup>225</sup> (Pearson 1930: 248; Fancher 1983: 227). Notwithstanding, the first intelligence test was still invented alongside the booming eugenic movement initiated by Galton.

## 2 The era of intelligence testing

### 2.1 Binet’s summary of previous methods and the invention of the first intelligence scale

After Galton’s Anthropometric Laboratory had served more than nine thousand customers, it was Alfred Binet (1857–1911), a French psychologist, who stood up to dissent. In 1905, Binet and his colleague Theodore Simon published the ‘New Methods for the Diagnosis of the Intellectual Level of Subnormals’<sup>226</sup> – the first modern IQ test, which became known as the Binet-Simon scale. In this article, the methods used by previous authors to recognize inferior states of intelligence are grouped into three categories:

‘1. The medical method, which aims to appreciate the anatomical, physiological, and pathological signs of inferior intelligence. 2. The pedagogical method, which aims to judge the intelligence according to the sum of acquired knowledge. 3. The psychological method, which makes direct observations and measurements of the degree of intelligence’ (Binet and Simon 1905: 202).

Galton’s measurement of physical traits is categorized as ‘the medical method’, while their own test is classified as ‘the psychological method’. The differences between the

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<sup>224</sup> For more information on Pearson and his cooperation with Galton, see Pearson (1991); Herbert (2001) and Blaney (2011).

<sup>225</sup> See Galton’s letter to Pearson, 31 December 1901.

<sup>226</sup> This work was first published in French in the journal *L’Année Psychologique*. The English translation appeared in Binet’s 1916 book: *The development of intelligence in children*.

three methods are that:

‘The medical method is indirect because it conjectures the mental from the physical. The pedagogical method is more direct; but the psychological is the most direct of all because it aims to measure the state of the intelligence as it is at the present moment. It does this by experiments which oblige the subject to make an effort which shows his capability in the way of comprehension, judgment, reasoning, and invention’ (p. 202).

Binet criticized the medical (Galtonian) method, although he himself had gone down this route for approximately ten years – his earlier work adopting the same method as Galton’s of measuring heights and head sizes, but differing in its approach concerning how to process the data.

In contrast to Galton’s statistical approach to identify a correlation, Binet’s method involved a simple comparison between high-scored students and all the students tested, and examined whether the heights and head sizes of the excellent students were higher and larger than the average. Such superficial comparisons saved Binet from the endless computation and statistics that had entangled Galton. Binet’s research saw a favourable turn in 1904 when he was invited to devise a technique to screen out retarded children from public schools in Paris as part of the urbanization and eugenic movement in Europe. By focusing on the subnormal, Binet was able to incorporate all his earlier findings into the brand new Binet-Simon scale, which was published one year later. The Binet-Simon scale (1905) is composed of a series of tasks corresponding to different mental levels. These tasks test the abilities of students in comprehension, judgment, invention and reasoning. The mechanism of reasoning had been considered by Binet ten years earlier in *The psychology of reasoning, based on experimental researches in hypnotism* (1886).

From 1890, Binet began to study the mental developments of his own daughters. In 1894, he published a book relating to the cognitive facilities in chess playing, concluding that visual memory and imagination are essential for making good chess judgements. Thus, the 1905 scale derived from his previous training and practices in psychology, and Binet’s long-term studies of the mechanisms of thinking and mental development in children played the main role in this. Moreover, his later practices were also responsible for making the scale more convenient to use. First, the serial of tasks were subdivided in relation to elements such as following commands, copying patterns, naming objects, and putting things in order or arranging them properly. Second, the test results from the scale were simplified and referred to as the

‘intelligence quotient’, or ‘IQ’ for short. IQ is the ratio of ‘mental age’ to chronological ages, and the average value is 100. For example, if an 8-year-old child can pass the test of the 10-year-old level, he then has an IQ of  $10/8 \times 100 = 125$ .<sup>227</sup> A comparison between Galtonian statistics and the Binetian psychological method foreshadowed how the intelligence test would develop further in the psychological domain.

## 2.2 *The promotion of Goddard in America*

The publication of the Binet-Simon scale in 1905 did not attract much attention in Europe. It was Henry Goddard (1866–1957), an American psychologist and a zealous eugenicist, who reconstructed it and popularized the new version of the test (in America to begin with). Goddard obtained a doctoral degree in psychology in 1899, and his first job was teaching and researching post in the New Jersey Training School for Feeble-minded Girls and Boys. At the outset, he was clueless about how to assess the intellectual ability of children (Benjamin 2009: 20), but during a short visit to Europe in 1908, Goddard encountered the Binet-Simon scale. He translated the French original into English and made some small modifications to it,<sup>228</sup> before distributing ten thousand copies of the revised scale to American public schools. In contrast to Europe, the United States was dealing with a population influx from diverse races and social classes at the turn of the century. Within this environment Goddard was soon provided with an opportunity to test immigrants at Ellis Island, beginning in 1913 (Benjamin 2009: 20). During the following year, he became the first psychologist to introduce evidence from the Binet tests in a court of law<sup>229</sup> (p. 20–21) and, from this point on, intelligence testing prospered in America, becoming a dominant tool in psychology.

Concurrently with popularizing the test, Goddard was also zealously advocating eugenics. His most famous and influential book was published in 1912, and became one of the classics on eugenics: *The Kallikak Family: A Study in the Heredity of Feeble-Mindedness*. In introducing ‘the Kallikak family’, Goddard shows that the descendants of ‘a retarded girl’ were intellectually inferior, and asserts his thesis of the ‘heredity of Feeble-Mindedness’ (Goddard 1912). He then advocated placing restrictions on the reproduction of ‘feebleminded people’. This proposal soon came to be favourably viewed and accepted by other eugenicists for its combination with psychological science, which had barely been seen in previous applications. With

<sup>227</sup> The level (scale) of intelligence is determined in this way by finding a test that the majority of an age group can pass. For example, if 70 percent of 8-year-old children can pass a test, then success on this test represents the 8-year-old level of intelligence.

<sup>228</sup> Several modified versions of the Binet-Simon scale were still called Binet tests at this time. For more information on Goddard’s and others’ versions, see Zenderland (2001).

<sup>229</sup> Forty years later, Klineberg won a court case by introducing his own test results.



Goddard's promotion in the first two decades of the Twentieth Century, intelligence testing became commonly used, not only in psychology research, but also in the eugenic circle (Degler 1991: 36). In contrast to Goddard's emphasis on heredity, another tester in this period, Robert Dugdale (1910), argued that environmental factors played a strong causal role in intelligence on the grounds that education can change the characteristics of people. Such changes, he suggests, will take two to three generations to occur (Degler 1991: 38). These thoughts inspired successors, including Klineberg, to study the behaviours of multi-generation immigrants in America.<sup>230</sup>

### 3 Scientific Racism in 1900s–1920s America

Together with the eugenic movement, the popularity of the intelligence test had sown the seed of Scientific Racism. In Goddard's publications, the comparisons are between different levels of intelligence of one human stock, with no clear discrimination against other races. However, the social effect of intelligence testing saw a no sharp-turn propelled by governmental policies. Following the legal authorization of eugenics in most states of America, and with the ever-burgeoning numbers of immigrants during the first fifteen years of the Twentieth Century (p. 48), the intelligence test was eventually applied to make a distinction between races. As a forerunner of such distinctions, Lewis Terman (1877–1956), in his *Were we born that way?* (1922), makes the first contrasts between white Americans and [the black and Amerindian people], and between white Americans and [the Chinese and Japanese immigrants].<sup>231</sup> He reports that the first [\*] pair scored lower than the average white person, but the second pair scored equally. Terman did not relate the results to cultural factors, but took them as confirmation of Galton's theory that 'mental abilities are chiefly a matter of endowment'<sup>232</sup> (Sweeney 2001). Following Terman, another American psychologist, Carl Brigham,<sup>233</sup> tested members of the armed forces. In his report, Terman considers 'the Negro' as inferior and proposes to prohibit their recruitment to the army and their immigration to the United States (Brigham 1923). Thus, we can see that, in 1920s America, intelligence testing became a frequently employed tool in the trend of Scientific Racism (Chase 1977). The Immigration Act of 1924 marked the peak of this trend by restricting immigrants from certain nations. However, many psychologists and testers were critical of this Act because the prescribed racial distinctions were not

<sup>230</sup> The study of American immigrants is the core part of Klineberg's research.

<sup>231</sup> Terman had inspired Klineberg to conduct a similar racial-comparison test, as acknowledged by Klineberg (1940).

<sup>232</sup> Terman revised the Binet-Simon scale to become the Stanford-Binet test in 1916. Using the new test in 1917 – and based on the biographic stories of Galton's childhood – Terman classified Galton as a genius (Fancher 1983: 228).

<sup>233</sup> Brigham's post-publication report immediately drew Klineberg's attention to 'the Negro'. A large amount of his *Social Psychology* is devoted to cautiously challenging Brigham's claims and results.

supported by their scientific reports. For example, Robert Woodworth,<sup>234</sup> a student of James Cattell and PhD co-supervisor of Klineberg, suggested individual screening rather than racial selection for assessing immigrants (Degler 1991: 54). Up to now, we are still clueless about how Klineberg became interested in the sociocultural (environmental) influences on racial characteristics, however. Was this concern learned from sociological studies?

### Racism among sociologists and Klineberg's role in Social Psychology

By the early decades of the Twentieth Century, there were an even greater number of racist claims being made in sociology than there were in psychology. Sociologists that used less objective methods were often the most disposed towards such racist claims and outlooks. For example, Gerrit Lansing (1882) objected to Chinese immigration; whilst Wiliam Elwang<sup>235</sup> (1904) claimed that 'the Negros' could not create civilizations. Less racist was William Dubois,<sup>236</sup> a black sociologist, who argued that 'the Negro is primarily an artist', referring to their art achievements, which is a cultural concept. During the 1880s, John Powell, a follower of Lewis Morgan (1818–1881), classified human societies into savagery – barbarism – civilization, determined by their intellectual levels. He believed that all societies are progressing towards civilization, and this shows a moderate (less racist) belief in the inferiority vs. superiority of different human groups (Haller 1971).<sup>237</sup> Another sociologist at Columbia University, Franklin Giddings, denied that the lack of opportunity prevented the Chinese and the Amerindians from achieving as much as the dominant white race did (Degler 1991: 61). In line with Elwang's argument that 'the Negros cannot create civilization', Giddings contends that, even granted an equal opportunity with white people, they would not be able to reach the same standard of development.

But, the question here is what is being developed? As we know, people do not cherish power or dominance in all civilizations. For instance, Klineberg suggests that although the Chinese were the first to synthesize the black powder (gunpowder), they did not use it as a military application. In such cases, how do we judge which race achieves the civilized standard – the one that first produces the composition or the one that

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<sup>234</sup> Woodworth, like Klineberg, obtained a doctorate of psychology at Columbia University. He was the co-supervisor of Klineberg's PhD study along with Franz Boas. But, as Part II below will explain, Klineberg changed his PhD project in his second year through the influence of Boas' anthropological thoughts. For more information on Woodworth and his research on Race Psychology, see Winston (2004) and Richards (2012).

<sup>235</sup> From Columbia University.

<sup>236</sup> Dubois was a close friend of Klineberg's. For more information on Dubois, see Bulmer (1991) and Rabaka (2007). For more information on his contact with Klineberg, see Klineberg (1974).

<sup>237</sup> In 1883, Powell coined the word 'acculturation' to refer to psychological changes induced by cross-cultural imitation.

applies its use to war? To solve this problem, Klineberg introduced cultural influences to explain racial differences by providing an equal environment (culture) for ‘the Negro’, Chinese and white students to study together. This, he hypothesizes, should eliminate the original cultural impact and foster them on the same basis through external intervention – immigration and education. As a matter of fact, the prejudice-holders before Klineberg did not notice (or care about) cultural factors. For example, Giddings’ claim that ‘they have not the same inherent abilities’ was too quick to simply assume and assert a biological distinction. In contrast, Klineberg considers the cultural stereotype in one region and its impact on people’s social behaviours – a viewpoint that conflicts with biological determinism. If Klineberg’s sociocultural concerns were not enlightened by contemporary psychologists or sociologists, then who did prompt them? This question will be answered in the following part by introducing his study and research at Columbia University that helped to ultimately end segregation policies in American schools.

## **Part II: Klineberg’s study and the furtherance of racial equality**

### **4 Otto Klineberg’s life and career at Columbia University**

#### *4.1 Education*



Fig. 5.1 Otto Klineberg (CRP<sup>238</sup>)

Otto Klineberg (1899–1992) was born in Quebec,<sup>239</sup> Canada and migrated to America

<sup>238</sup> The Regional Council of Psychology.

<sup>239</sup> Although Klineberg was brought up in Montreal.

at the age of twenty-six. He first studied philosophy and psychology at McGill University for a bachelor's degree. After graduating in 1919, a tuition scholarship sponsored him to study philosophy at Harvard University. During his master's study there, Klineberg attended lectures by Floyd Allport<sup>240</sup> (1890–1979), the father of American experimental social psychology. However, when he returned to Canada, Klineberg said he wasted five years of time studying medicine and psychiatry at the McGill Medical School, where he received an M.D. in 1925. He then went to the United States again, to undertake a Ph.D. in psychology at Columbia University. When Klineberg studied there, the teaching staff at the Psychology Department included James Cattell, Robert Woodworth, Edward Thorndike, Henry Garrett, John Dewey, and so on. In addition to these psychologists, there was also Franz Boas who, though based in the Department of Anthropology, once taught statistics in the Psychology Department. At that time, Columbia University was at the frontline of the Scientific Racism debate, which was reflected in the scholars' conflicting propositions. Henry Garrett was the most famous of the racist camp, being a strong advocate of racial segregation, and Thorndike was the PhD student of Cattell, both of whom expressed serious reservations about higher education for women. As usual, their arguments derived from biological explanations for racial or sexual differences (Degler 1991: 31).

As the head of the department, Cattell, and the successive head Garrett, had tried to persuade Klineberg to follow their research principles after his PhD to study biological distinctions. Nevertheless, Klineberg's interest was directed by his supervisors, Woodworth and Boas, to the opposite side – to studying cultural factors such as social cohesion and national unity in immigrant groups. Although Klineberg certainly benefited from his study of psychology, the most influential person on his PhD project was the anthropologist Boas. In his thesis acknowledgements, the largest proportion is devoted to Boas: 'Professor Franz Boas, who was largely instrumental in making this investigation possible, and whose critical approach to the problem of psychological differences between races did much to clarify and define the writer's point of view' (Klineberg 1927).

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<sup>240</sup> Allport was one of the creators of social psychology. For more information on Allport, see Katz (1979); Brooks and Johnson (1978). For more pioneers in social psychology, see Katz et al. (1998).

Boasian influences

Fig. 5.2 Franz Boas (NMM)

Franz Boas (1858–1942) established academic anthropology in America, and divided the discipline into four fields: sociocultural, biological, linguistic, and archaic anthropology. His life was devoted to enlarging the first field by interpreting human features and conduct using sociocultural factors.<sup>241</sup> Boas contends that human behaviours result from nurture rather than nature, as delivered in his 1884–1899 articles<sup>242</sup> (Degler 1991: 68). He further argues that each culture or society should be studied in its particularity and deserves respect – a viewpoint in direct opposition to the evolutionary one commenting on the civilized level of one culture or society. In arguing for this position, Boas was fighting discrimination against immigrants and became one of the most prominent opponents of the trend of Scientific Racism.<sup>243</sup> Gossett (1970) heaps praise upon Boas: ‘It is possible that Boas did more to combat race prejudice than any other person in history’ (p. 418). Klineberg came to know Boas in his first year classes at Columbia, which were given by Boas and his student Edward Sapir, who was also an anthropologist. Attracted by their interest in the role of

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<sup>241</sup> For more information on Boas’ contribution to cultural anthropology, see Stocking (1974).

<sup>242</sup> For example, see Boas (1889; 1892; 1896).

<sup>243</sup> For more information on Boas’ role in antiracism, see Stocking (1968).

cultures and backgrounds in influencing human behaviours, Klineberg had decided to change his PhD topic from the earlier M.D.-based abnormal psychology to one concerning cultural influences on human races by the end of this year (1926) (Klineberg 1974: 166–167). Boas supervised Klineberg's new project and suggested to him that he study American Indians (see Fig. 5.3 below).

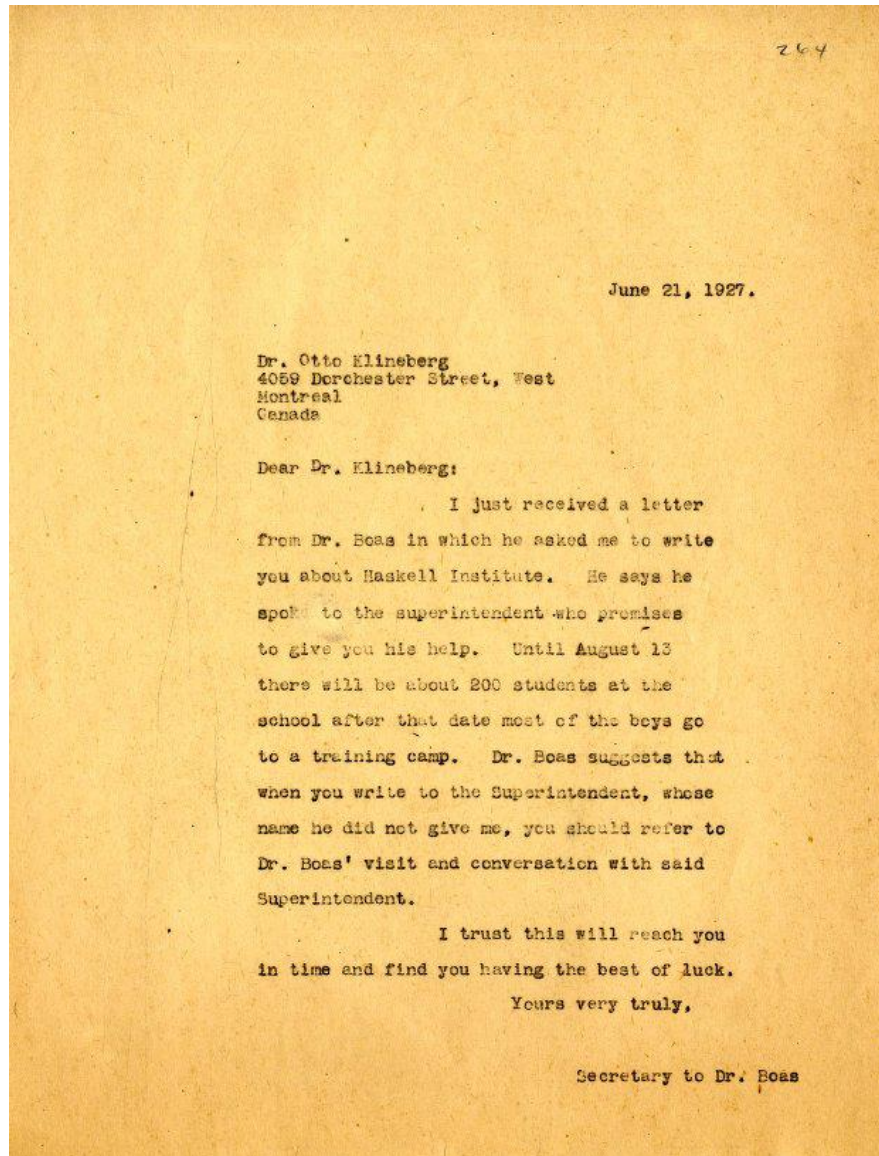


Fig. 5.3 Boas' letter to Klineberg on 21 June 1927 (APS<sup>244</sup>)

In 1927, Klineberg joined Melville Jacobs – an anthropology student – to conduct this research on 200 schoolboys in the 'Haskell Institute'. Klineberg adopted Boas' idea of studying the shift of racial properties in a new sociocultural environment. This proposal can be found in Boas' most famous and groundbreaking work: 'Changes in

<sup>244</sup> American Philosophical Society Digital Library.

the Bodily Form of Descendants of Immigrants',<sup>245</sup> an article in the 1912 issue of *American Anthropologist*. Boas tested the cranial index (which is determined by the ratio of the breadth to the length of the head<sup>246</sup>) of immigrants, and found that this differed significantly from first generation Russian and Sicilian children to non-immigrant children in Russia and Sicily (Powell 2005: 37). This proved that people who have the same genetic backgrounds but grow up in different environments can differ in their bodily shapes, and that racial characteristics are not internally stable. Boas' report provided a serious threat to Scientific Racism, and aroused many responses.<sup>247</sup> Klineberg combined the thought of Boas with the psychological method of intelligence testing to study the developmental intelligence of children. This combination proved highly successful, and it only took Klineberg two years to complete his doctoral degree. The outcome of Klineberg's investigation will be introduced in the Section 5.

#### *4.2 Establishing a new Department of Social Psychology after a racism debate*

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<sup>245</sup> This is a synthesis of his previous reports, e.g. Boas (1899) and (1900).

<sup>246</sup> The cranial index, or 'cephalic index', was invented by Morton.

<sup>247</sup> For the influence of Boas' report, see Kaplan (1954) and Spiro (1955). For recent reflections on Boas' results and claims, see Sparks and Holloway (2002); Jantz (2002) and Gravlee et al. (2003).



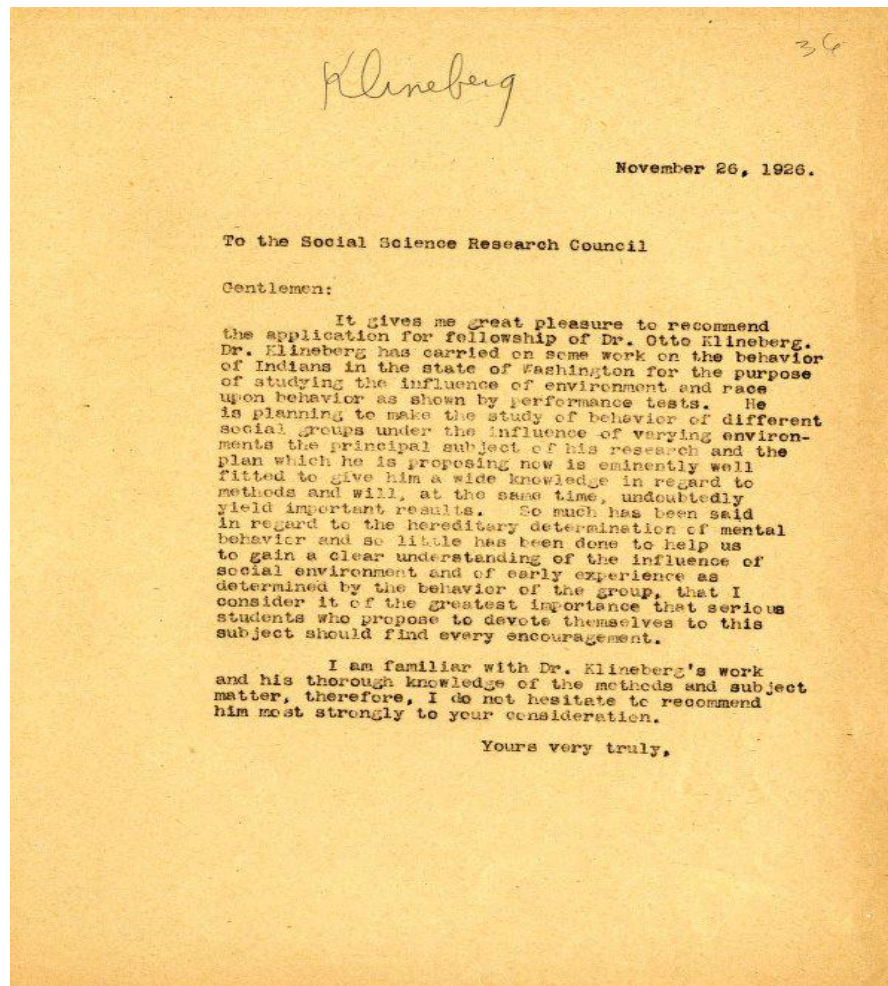


Fig. 5.4 Boas' recommendation letter for Klineberg, 26 November 1927 (APS)

After graduation, Boas invited Klineberg to work as research associate in the Anthropology Department, see Fig. 5.4 above.<sup>248</sup> In 1931 he took on the role of an instructor in the Psychology Department, where he remained for thirty years. During his service there, Klineberg kept on digging into psychological problems using sociocultural explanations. He travelled widely with his wife and collaborator Selma Gintzler,<sup>249</sup> and held visiting appointments during which he researched local races in Mexico (in 1933),<sup>250</sup> China (1935–1936), and Brazil (1945–1947).<sup>251</sup> Between 1941 and 1955, the Chair of the department was the segregationist Henry Garrett, who disagreed with Klineberg's racial equality ideology. When Klineberg acquired his professorship in the 1950s, their contradictory views finally came into direct conflict when they openly opposed each other in the 1954 U.S. Supreme Court's desegregation

<sup>248</sup> Boas was, at that time, the director of the Anthropology department.

<sup>249</sup> They married in 1933 and had three children.

<sup>250</sup> From 1927 to 1929, Klineberg himself travelled to Europe under a National Research Council Fellowship (Klineberg 1974: 167).

<sup>251</sup> He was invited by his former student Andre Drefus to establish a Psychology Department in the University of Sao Paulo (Klineberg 1974: 173).



decision – *Brown v. Board of Education*. This declared that state laws requiring separate public schools for black and white students were unconstitutional, and was a major victory for integration and the Civil Rights Movement.<sup>252</sup> Klineberg was one of the primary contributors to the decision, while Garret was an ardent opponent of it (Whitman 2004). In supporting the decision, Klineberg became the first person in history to quote evidence from intelligence tests in a legal case.<sup>253</sup>

The conflicts between Garret and Klineberg eventually led to the division of the Psychology Department at Columbia University. With help from other departments and some social funding, Klineberg established a separate Department of Social Psychology.<sup>254</sup> The family consisted of Klineberg, Bill McGuire, Dick Christie and Stanley Schachter. After a short period, Klineberg left for France, and Bibb Latane joined the department. McGuire's research interest was in attitude change, Christie's in personality, Schachter's in group dynamics and Latane's in the social behaviour of animals (Lindzey 1989: 463). Later, with the rapid development of social psychology, and after Klineberg and Garrett had both left, the two departments united again, which was not uncommon in the American schools of psychology at this time. From 1962 to 1982, the next longest period of Klineberg's life was spent in Paris, where he taught at the University of Paris and the Ecole des Hautes Etudes (Lambert 1992). After his retirement to Manhattan in 1982, he taught part-time at the City University of New York until 1990<sup>255</sup> (Sheehy et al. 2002: 327). He died in Bethesda, Maryland, at the age of ninety-two (Lambert 1992). Although his PhD study at Columbia was completed in just two years, it is representative of Klineberg's lifetime studies of racial equality, and provided a crucial blow to Scientific Racism. Section 5 below now takes an in-depth look at this piece of work.

## 5 Klineberg's intelligence test on racial groups

‘The application of intelligence tests to the study of racial differences has usually been subject to the criticism that educational, and particularly linguistic, factors were principally responsible for the results. While the attempt has frequently been made to equate groups for these factors, for example by taking American Indian or Negro children from the same school grades as the white children with whom they were being compared, it has been quite impossible to equate for the more subtle educational influences of the home, the group, and the social and cultural

<sup>252</sup> For more information on the decision, see Myrdal (1944) and Dudziak (2004).

<sup>253</sup> ‘He testified as an expert in a Delaware suit that was one of four cases consolidated for the Supreme Court, and the only one that the integrationists had won in the lower courts’ (Lambert 1992).

<sup>254</sup> With the help of the American Jewish Committee, Klineberg persuaded Joseph Klingenstein to sponsor the studies of racial relations in the new department (Lindzey 1989: 463).

<sup>255</sup> In 1925 around 60 years before this, the same college offered him a job that he turned down.

behaviour patterns' (Klineberg 1927<sup>256</sup>: 273).

Before 1927, many attempts had been made to determine which factors constitute an equal level of educational opportunity for diverse races.<sup>257</sup> These studies vary widely in purposes and techniques, and are affected by the interests and backgrounds of the testers. As Klineberg comments, 'the conclusion is not warranted unless, and until, the groups are equated for other non-racial factors' (1928: 11). The seven factors in earlier scholarship comprise: language, schooling, culture,<sup>258</sup> social and economic status (e.g. occupation), rapport (the relationship between the tester and the subjects), motivation (of the subjects) and sampling. Klineberg was the first to focus on the 'speed' factor in testing intelligence between human races, and the subjects he used were also being studied for the first time: Yakima Indian and white children living in the Yakima Indian Reservation, Washington.<sup>259</sup> Klineberg tested the speed and effectiveness with which the subjects could solve problems, and maintained that his results showed that racial differences in the tests are entirely related to speed (Harmon 1937: 279). The cause of the differences is discovered by comparing the urban and the rural groups, with Klineberg concluding that 'the difference of speed corresponds to differences in economic and cultural environment' (Klineberg 1928: 44). That is, the Indians living in the reservation area 'see no need for hurry' (p. 31), in contrast to those living the modern city life, which values speed and competition (p. 34).

In earlier scholarship, the 'white' group usually had better scores in tests or measurements than other groups, implying a slight advantage over other races. Thanks to the anthropological training given by Boas, Klineberg was one of the first to consider the racial purity of the subjects. The Indians were grouped by  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  of their Indian heredity bloodlines to see whether this had any association with their test performances. The results show that the decrease in Indian blood does not correspond to an increase in test scores (p. 44). This represented another crucial blow to Scientific Racism, and the equality between American Indians and Anglo-Saxon whites was for the first time declared (p. 43).

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<sup>256</sup> Before the doctoral dissertation was archived by Columbia library in 1928, a much shorter report was published by Klineberg as an article in the 1927 issue of *The Journal of Abnormal and Social Psychology*.

<sup>257</sup> For a literature review on these pieces of scholarship, see Mann (1940).

<sup>258</sup> Under Klineberg's classifications, 'schooling' is separated from 'culture', which includes all customs and conventions.

<sup>259</sup> Klineberg first went to Europe to look for 'unaffected' racial groups, but was unsuccessful in this pursuit. Even if pure races could be found, there would still be many uncontrolled factors, as summarized above. Given this, Klineberg confesses that the intelligence test is not applicable to different groups brought up in different cultures (Klineberg 1928: 15). So, he turned to focus on different racial groups living in the same area.

In two successive books, Klineberg (1935a, 1935b) continued to test the intelligence of black immigrants, reporting that the black people in four northern states did better on average than the white people in four southern states. The cause of this result is attributed to the fact that there is much lower expenditure on education in the South. Furthermore, a direct correlation between income/social classes and performance on intelligence tests was also established. Both of these findings were critical to the success of the desegregation case in 1954. After this, Klineberg's life was mostly devoted to building an international association to fight against racism.<sup>260</sup> Mann (1940) summarizes the studies in *Race Psychology* (psychological studies of human races) between 1930 and 1940, categorized by intelligence tests and artistic records, and so on. According to Mann and other scientific historians, there seemed to be no racial research on emotional expression in this decade. However, they overlooked a short but groundbreaking work by Klineberg who, in 1938, examined Chinese expression using a literary approach. Part III below takes an in-depth look at this piece of work to fill in the gap in the standard history.

### **Part III: Klineberg's literary study of expression**

#### **6 Klineberg's report on Chinese expression**

'The fact that the expression of the emotions is at least to some extent patterned by social factors is probably known to all psychologists. Even in our own society there is considerable evidence that this is so. When we turn to the descriptions of other cultures, instances of this patterning occur frequently. One of the most striking examples is the copious shedding of tears by the Andaman Islanders and the Maori of New Zealand when friends meet after an absence, or when two warring parties make peace. Another is the smile with which the Japanese responds to the scolding of his superior, or which accompanies his announcement of the death of his favourite son' (Klineberg 1938: 517).

When travelling worldwide, Klineberg was amazed at the unique emotional expressions he observed in the Maori and Japanese, as quoted above. This interest led to a study on how the expression of emotions is patterned by social factors. Klineberg's first attempt was conveyed in a short article, the 'Emotional expression in Chinese literature', published in the 1938 issue of *The Journal of Abnormal and Social Psychology*. As he admits at the beginning of this article, 'there is not much precedent for the reading of novels as a technique' for such studies. Chinese literature was

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<sup>260</sup> Klineberg was an early president of SPSSI (The Society for the Psychological Study of Social Issues) and served twenty years in UNESCO. For an introduction to his other social positions, see Lambert (1992) and Sheehy (2002).

selected because ‘it seemed valuable in the case of a civilization as articulate as the Chinese’ (p. 517), and two types of materials were consulted: textbooks of Confucian rituals, and classic novels. These sources serve different purposes in the article, which are discussed separately below.

### *6.1 The amount of expression permitted in Confucian rites*

Confucian textbooks were part of the traditional life in ancient China, regulating everyone’s social behaviours. The first thing Klineberg learnt through studying them was the importance of gender differences in the regulation of emotions: ‘There are many admonitions – especially to the young girl – not to show emotion too readily’ (p. 517). In ancient China, there were specific treatises for educating women in their behaviours, such as the *Required Studies for Women*, which instructs: ‘Do not show your unhappiness easily and do not smile easily’; and ‘Do not let your teeth be seen when you smile’ (quoted from Klineberg, p. 517). These texts advise women to moderate their expressions of emotions – that is, to lessen the amount of expression. This inspired Klineberg to think about a general question concerning the amount of expression that the (ancient) Chinese culture/civilization permitted. Apart from the above quotes warning women to reduce the amount of emotion they express, there are some occasions on which the emotions have to be displayed to a certain standard or degree. *The Book of Rite*, published in the Han Dynasty (206 B.C.–24 A.D.) is one of the classic textbooks on Confucian rites, and Klineberg discovered that a considerable portion of it is devoted to the technique of the mourning ceremony, with elaborate instructions on ‘what procedure should be followed in order that the expression of the grief may be socially acceptable’ (p. 517).

### *6.2 The universal or unique expressions described in Chinese novels*

The second question that Klineberg sought to answer in this article was whether ‘the descriptions of emotional expression [in Chinese writings] correspond closely to our own’ (p. 518). To do so, he read several famous novels that were written in the Ming Dynasty (1368–1644 A.D.): *The Romance of the Three Kingdoms*; *All Men are Brothers* (A. M. B.); and *The Dream of the Red Chamber*. These are three of the top four most read classic novels in China.<sup>261</sup> From these books, there is no doubt about the frequent similarities between Chinese and Western forms of expression, but the differences are also clear. For example, Klineberg shows particular interest in anger, as it is often connected with expressions such as ‘round eyes’, ‘eyes wide open’, ‘staring’, and so on. In general, fear and anger ‘are expressed in very much the same way in the

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<sup>261</sup> For an introduction to them, see Plaks (1987) and Ropp (1990).

Chinese literature as in our own' (p. 518), but he also observed some unusual descriptions of anger in these novels: 'he laughed a great ho-ho', 'he smiled a chill smile', and 'he looked at them and he smiled and cursed them' (p. 518). Klineberg concludes that, whilst the laugh, smile or contempt of anger occur in Western culture, they do not occur nearly so frequently as they do in China and in the Chinese literature.

An even more curious expression to Klineberg is how Chinese men are described as fainting from anger in numerous cases. When Klineberg's Chinese friends were consulted about this phenomenon, they replied that they in turn could never understand why European women fainted so frequently in the mid-Victorian literature with which they were acquainted (p. 519). Klineberg explains that, in the Western world of not so long ago, the delicately nurtured girls in upper classes did faint with astonishing ease and regularity. Furthermore, there were even etiquette books teaching them how to faint elegantly (p. 519). The 'etiquette books' here play the same role as the Confucian textbooks – as a cultural factor patterning emotional expressions.

### **Conclusion**

In Klineberg's doctoral dissertation, emotional states are mentioned just one time as an impact factor on test results (Klineberg 1928: 6), but emotion has become the central focus in the article of 1938. According to Ekman (1970) and Bond (1993), this was the only report addressing the cultural specificity of expression before the 1960s. Besides, it remains a unique essay on expression in relation to the purely literary approach it adopts. Here, I would like to consider the possible reasons for its uniqueness in the standard history.

The first one may be attributed to the defects in Klineberg's research. There are numerous different causes of this. To begin with, the two basic problems that are written as the titles to Sections 6.1 and 6.2 – *the amount of expression permitted in Confucian rites* and *the universal or unique expressions described in Chinese novels* – are not summarized by Klineberg at the end of the article or highlighted at the beginning. Next, neither of these problems is sufficiently unpacked or analysed due to the briefness of the whole essay. Lastly, the social and historical contexts of the literature that he examines are not provided. For example, the times at which the Chinese books were published and at which they were influential are not mentioned in the original text. Only the 'etiquette books' in the West are marked with a time-stamp – as 'mid-Victorian'.

For the second reason, we can look back to the research interests of the members of

the Social Psychology Department of Columbia. As Section 4.2 above discussed, no one at that time was particularly interested in emotional expressions, which was typical of the contemporary academia of social psychology. In those masterworks entitled *Social Psychology*, like Allport (1924) and Klineberg (1940), each chapter usually discusses more than one social issue, with little concern ever being given to emotional expression. In the other schools of sociology, the racist climate described in Section 3 inhibited its contribution to the study of cultural speciality.

Last, but not least, there were a lack of parallel reports by scholars based in non-Western countries who were more familiar with the native languages and cultures, e.g. the *Narrative* by Swinhoe. Bearing this problem in mind, the following concluding chapter will show how this factor will cast light on understanding the other methods discussed in this dissertation and the development of the expressional science in general.

## Conclusion

We have identified Darwin as being a naturalist for a long time, but we have seldom examined his research procedures – from his data collection and data processing through to his publication of that data. The *Expression of Emotions* offers us a better chance to reconstruct Darwin’s working method than his more well known works in biology do – the *Origin of Species* and the *Descent of Man* – not only because it is a smaller work but also, and more importantly, because his means of data collection are separately listed here. Moreover, some of Darwin’s methods – the recognition experiment, the questionnaire and the literary approach – were being used for the first time in the study of expression. By historically tracing Darwin’s use of these methods and their successive developments, this dissertation makes some novel contributions to Darwinian scholarship in particular, and the historiography of expressional science more generally. The achievements of this historical and quantitative analysis are summarized below.

### 1 Understanding Darwin’s expressional study

#### *1.1 Locating expression in Darwin’s research*

Apart from the general idea that the *Expression of Emotions* was originally part of the *Descent of Man*, the relation between the expressional treatise and Darwin’s earlier research has not been considered in depth before, and this has led to some problems in the extant scholarship, with Montgomery (1985) going so far as to regard the *Expression of Emotions* as ‘non-Darwinian’. In this thesis, several aspects of their relationship have been revealed. With regards to the three principles, the mind-action association discussed in their definitions and the non-emotional but instinctive behaviours exemplified in the observational facts have been shown to be consistent with the wording and facts in the *Instinct* chapters of the *Origin of Species* and the *Descent of Man*. By focusing on the external manifestation of mental states, the *Expression of Emotions* actually concludes Darwin’s long-term studies of the instinct.

The three principles are thus offered as the mechanisms for accounting for mind-action association. Through an elemental analysis, the habitual association described in the first principle was found to have been something that Darwin arrived at much earlier than 1859, being first developed in the 1838 ‘Notebook M’. Furthermore, the evolutionary mechanisms expounded in Chapter I are exactly the same as those proposed in the *Instinct* chapter of the 1859 book. Darwin’s conclusions – that expressions of emotion are derived from lower animals and that they are universal

amongst human races – are known as his long-term presumptions/hypotheses. Moreover, when the six research methods are interpreted as being the means to provide observational examples, two other methods/sources are discovered. Such a comprehensive use of methods is typical of Darwin's naturalistic methods of data collection. All the above findings show that Montgomery was misconceived in isolating the *Expression of Emotions* from Darwin's other research, and they serve to solidly contextualize the expressional treatise in the naturalist's long-term thinking regarding mental problems, especially the instinct.

Apart from revealing this association, our analysis may be also helpful for identifying the exact period at which Darwin compiled his files and completed this essay. From previous scholarship, we only know that Darwin's expressional study started in 1839, when he began observing his first child, and that the expressive facts he gathered came to significantly exceed the volume of chapters in which he could deal with it in the *Descent of Man*, and was thus turned into a separate book. From our discussion in Chapter 1, we know that, utilizing a naturalist approach, the three principles were essentially used to categorize the collected data, and that they could not have been invented before Darwin compiled his files (although it was not clear when exactly this was done).

From the results of our elemental analysis, we know that the idea of the 'serviceable' was taken from Spencer's 1863 publication, and the physiological essays on the nervous system offering the theoretic basis of the third principle were all published around 1860. These facts seem to indicate that Darwin had started to write the other two books together immediately after the publication of the *Origin of Species* (1859), and did so between 1860 and 1870. Moreover, in the early years of this decade, the expressional research had not been separated from the composition of the whole book – the *Descent of Man*. This information can be derived from an earlier version of Darwin's expressional queries. Before the global survey in 1867, Darwin sent one shorter questionnaire to Thomas Bridges on 8<sup>th</sup> January 1860, entitled 'Expression of Savages', which is the earliest version of the expressional queries we can find today. Mr. Bridges was an English missionary in Tierra del Fuego, and observed Fuegians according to Darwin's questions. The questions that Darwin sent to him are listed below, and their more mature forms in 1867 are also listed for comparison. Those numbered '1, 2, 3,' are from the 1860 query, with No. [10], [12] and [13] being crossed off, while those in italics and numbered '(1), (2), (3)' are printed in the 1867 version.



## Expression of Savages

1. Do the Fuegians or Patagonians or both nod their heads vertically to express assent and shake their heads horizontally to express dissent?

*(16) Is the head nodded vertically in affirmation, and shaken laterally in negation?*

2. Do they blush? And at what sort of things? Is it chiefly or most commonly in relation to personal appearance or in relation to women?

*(2) Does shame excite a blush when the colour of the skin allows it to be visible? And especially how low down the body does the blush extend?*

3. Do they express astonishment by widely open eyes, uplifted eyebrows and open mouth?

*(1) Is astonishment expressed by the eyes and mouth being opened wide, and by the eyebrows being raised?*

4. Do they evince anger or fear by same expression of countenance & actions as we do?

*(3) When a man is indignant or defiant does he frown, hold his body and head erect, square his shoulders and clench his fists?*

*(11) Is extreme fear expressed in the same general manner as with Europeans?*

5. Do they express contempt by the same gesture[s] as we do, namely by turning up nose and puffing out their breath or even spitting?

*(9) Is contempt expressed by a slight protrusion of the lips and by turning up the nose, with a slight expiration?*

6. Do they sneer, which is chiefly shown by turning up the corners of upper lip?<sup>262</sup>

*(7) When a man sneers or snarls at another, is the corner of the upper lip over the canine or eye tooth raised on the side facing the man whom he addresses?*

7. Do they frown when trying to understand anything or considering any difficulty?

*(4) When considering deeply on any subject, or trying to understand any puzzle, does he frown, or wrinkle the skin beneath the lower eyelids?*

8. Do they ever shrug their shoulders to show that they are incapable of doing or understanding anything?

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<sup>262</sup> This question was originally the eighth, but is ringed with an insert mark to show that it should be put as the sixth.

(13) *When a man wishes to show that he cannot prevent something being done, or cannot himself do something, does he shrug his shoulders, turn inwards his elbows, extend outwards his hands and open the palms; with the eyebrows raised?*

9. What ideas of feminine beauty have the Fuegians; do they admire women with strong American cast of countenance or such as at all approach Europeans in appearance?

[10]. Do the Fuegians take any pains in breeding or matching their dogs; or is all left to chance? – The habits of the Fuegian dogs would be worth observing. (this question is crossed off)

On the back

11. When out of spirits or (in some [deleted]) dejected do they turn down the corners of the mouth?

(5) *When in low spirits, are the corners of the mouth depressed, and the inner corner of the eyebrows raised by that muscle which the French call the "Grief muscle"? The eyebrow in this state becomes slightly oblique, with a little swelling at the inner end; and the forehead is transversely wrinkled in the middle part, but not across the whole breadth, as when the eyebrows are raised in surprise.*

Any information on the manner of Expression of countenance of any emotion in savages would be curious, and I believe is a subject, which has been wholly overlooked. – The only satisfactory method to collect information is to make notes at the time. –

[12]. Are the young of the Wild Pigs at the Falkland Islands striped lengthways on the back when first born? (This question is crossed off.)

[13]. What colour are the calves of the white cattle with red ears, on the Falkland Islands? (This question is crossed off.)

As listed above, there are thirteen questions in the 1860 query, covering the issues in Darwin's three big volumes: Nos. 10, 12 and 13 ask about domestic animals, and are related to the *Variation under Domestication* (1868); No. 9 concerns sexual selection in human beings, which is relevant to the *Descent of Man*; and Nos. 1–8 and 11 concern the expression of emotions, contributing to the *Expression of Emotions*. This shows that, after submitting the *Origin of Species* (1859) for publication, Darwin

collected evidence for the three volumes simultaneously.<sup>263</sup> The existence of the 1860 query<sup>264</sup> proves the extent of Darwin's interest in establishing contacts in distant areas for this research.

After sending *Variation under Domestication* to his publisher in 1867, Darwin then had more time to compile his files on expression. In the same year, he developed the modified questionnaire with the seventeen questions. From 1860 to 1867, all the nine questions on expression were preserved, and their details were developed. Question 4 – on anger and fear – was divided into two questions – (3) and (11). Most of the questions became longer, with more details concerning the expressions. The exception to this was Question 2 – on blushing. The original enquiry on circumstances that asked 'at what sort of things [is blushing seen]? Is it chiefly or most commonly in relation to personal appearance or in relation to women?' was later deleted. In fact, none of the questions in the 1867 version asked about the conditions under which the relevant emotions are aroused. Moreover, as summarized in Chapter 2, the replies that stressed the emotional conditions were all discarded. By adjusting this questionnaire and hiding the unwanted answers, Darwin attempted to produce the conclusion that different human groups express emotions in the same way.

#### The 'mysterious' Principle 2: eliciting the final conclusion to Darwin's hypothetico-deductive method

Following the questionnaire survey, Darwin then conducted the recognition experiments in 1868. By considering these methods together, maybe we can identify how the most curious principle – the Principle of Antithesis – was generated. Careful readers of our Chapter 1, where the observational cases for the three principles are quantified, may already have noticed that only animal expressions are given as examples for Principle 2. This raises a question – had Darwin ever tested this principle for human expressions? I intend to give a positive answer to this question, with evidence drawn from Darwin's use of Method 5: The questionnaire and Method 3: The recognition experiment. First, in the 1860 query, No. 11 was changed from 'when out of spirits or dejected...?' to No. (5), 'when in low spirits...?', whilst No. (6), made the addition to ask: 'when in good spirits...?'. The 'good' and 'low' spirits are antithesis emotions. Furthermore, as we saw in Chapter 3, the first two experiments presented in the book are Experiment 6 and 7 on crying and smiling muscles. It seems that Darwin had intentionally tested the antithesis expressions through both the questionnaire

<sup>263</sup> As Darwin acknowledged in his autobiography, he was accustomed to writing on different subjects at the same time.

<sup>264</sup> This preserved copy is a transcript by Darwin's long-term copyist, Ebenezer Norman (Freeman and Gautrey 1972: 214).

survey and the recognition of Duchenne's photographs. However, as Chapter 2 showed, due to the problems and constraints that existed in Darwin's correspondence network, the results were not satisfactory to Darwin, with the questions being sometimes unanswered, or sometimes answered with more detail than he wanted. Through the recognition experiments, the complex muscles in human faces had also interrupted Darwin's test of the second principle. Notwithstanding, two marks of 'antagonism' can be found in Darwin's annotations to Duchenne's book (on pages 43 and 53). Thus, Chapters 2 and 3 may have demonstrated Darwin's failed trials to test the principle in human expressions, and the derivation of the principle should be attributed to a date no later than 1867.

### *1.2 Darwin's information network*

In order to reveal the constraints on Darwin's questionnaire survey, Chapter 2 explored his China network, namely his contacts with Robert Swinhoe. By separately introducing Swinhoe's three roles as a diplomat, ornithologist and botanist, we grasped the activities in each community and the characteristics of their communication. We then concentrated on Swinhoe's interactions with Darwin on expression. The 'interaction' worked on both sides. On one hand, Swinhoe's investigation of Chinese expression was instructed by Darwin's fixed questionnaire. In contrast, the uninstructed records by Swinhoe during the Second Opium War contained within the *Narrative* actually contain more details on expression than his stylized replies to Darwin's query. Swinhoe and Darwin's communication is contextualized in the broader Sino-British network during the late Nineteenth Century, with the other scholars involved in the network including Joseph Hooker and Swinhoe's consul colleagues. A comparison between Darwin's and Hooker's networks reveals that Darwin's collection of information was independent of funding. Without an agent in China – like Hance was to Hooker – Darwin could not gain effective access to natives' observations or local literature on expression.

However, it is important to note that the factor that had the most impact on the questionnaire survey was Darwin's presumed hypothesis on racial universality. Chapter 2 summarized the characteristics of Darwin's use of the questionnaire data obtained from Swinhoe's observations of Chinese expressions in particular, and from the Asian answers more generally. By analyzing the data, Darwin's publication bias was uncovered, as we saw that many types of answers that contradicted his hypothesis were discarded, including emotive conditions and the cultural regulations on expression.

The other methods that Darwin used for his research on expression – the recognition experiment and the literary approach – also provided him with information. Our discussion in Chapter 3 established that Darwin’s interest in muscular movements paralleled his main arguments on the principles and the hypotheses, as can be seen from his quotation of Duchenne’s discussions of the photographs and the use of recognition experiments to test them. Moreover, Method 2: Observe psychopaths was also used to test his questions on those problems, as can be seen from his written correspondence with Crichton-Browne. With the published experiments discussed in Chapter 3, although Darwin altered some data to generate a less variable result, I was cautious in using the phrase ‘publication bias’ because, except for the first pair of experiments (6 and 7), the muscular movements concerned in the successive tests were irrelevant to the main hypotheses. Thus, the accusation of publication bias was only made in Chapter 2 regarding the much larger and broader set of data that Darwin discarded in support of his second hypothesis on racial unity.

All the three methods for examining expression that are discussed in this thesis involve the collection of information, but they all differ from each other in their approaches to doing so. The questionnaire asked for local observations of natives’ expressions, instructed by the pre-described details on the query, whilst the recognition experiments required viewers’ judgements on the photographed expressions of emotions. Finally, the literary approach extracted descriptions of emotional behaviours from narratives. Under the first two methods, both the designer/tester and the participators are aware that the surveys are related to expressional study, and they can communicate and even interact with each other in the processes. For instance, Darwin altered the printed questionnaire to delete one question as a result of the responses he received. In the literary study, by contrast, the one who records the expression has no idea about his involvement; hence the research is not guided or formatted for a scientific hypothesis. This uninstructed approach can sometimes provide more vivid and genuine descriptions, such as those provided by Swinhoe in the *Narrative*, as discussed in Chapter 2.

In the *Expression of Emotions* itself, the three methods also differ from each other in terms of their functions. Both the questionnaire and the recognition experiments were specially designed for a specific purpose: to test the racial universality of expression and to test the reality of the expressions in Duchenne’s photographs respectively. By contrast, the literary approach was a supplementary source for providing multiple data. As the last method discovered in this thesis, it may be the best window from which to view Darwin’s naturalist methods of data collection and, as summarized in Chapter 3, it marks the weak points in the author’s study of expression.

Barring some general impressions from his *Beagle Voyage* and the published work of the *Origin of Species*, we have had almost no knowledge of Darwin's criteria for collecting and processing data. Darwin's three main works – the *Origin of Species*, the *Descent of Man* and the *Expression of Emotions* – were all steadily built up through a naturalist method, but compared to the first two larger books, Darwin's expressional study offers us a better chance to examine his naturalist framework, because the methods used to collect data are clearly stated as six research methods. By focusing on the three of them discussed in Chapters 2 and 3, we have now been able to examine Darwin's research criteria and his particular interest in practices. Through this process we have also had the opportunity to grasp the ways in which these methods have been both complimentary and conflicting. For example, with respect to the racial universality of expression, whenever there was a lack of questionnaire data, literature was often cited as supporting evidence. Moreover, Method 2: Observe psychopaths was used complementarily with Method 3: The recognition experiment to study muscular movements in expressions on human faces. The fourth method – to observe sculptures and paintings – was also first pronounced to be useful for the same supporting reason, but it turned out not to provide the sort of valuable information that Methods 2 and 3 did. In the field of expressional science up to the present day, Darwin may still exceed all other researchers in terms of the number of research methods utilized in one piece of work. Our discussion has identified Darwin's aims in this comprehensive use of methods, and has found that some methods – e.g. Method 4 – did not really play a part in the published work.

## **2 Understanding the successive developments**

Darwin was one of the first to conduct recognition experiments and to use the literary approach in studying emotional expression. However, since his use of these methods had not been systematically summarized before, subsequent scholars have not been able to directly benefit from his achievements. For example, Feleky did not provide background information on her viewers and, unaware of Darwin's particular interest in facial muscles, Duchenne's photographs were not consulted further by successive testers. By reconstructing Darwin's working methods and procedures, we can establish the links between the achievements in the *Expression of Emotions* and post-Darwinian research in this area. Chapter 3 extracted the essential elements and procedures of the eleven recognition experiments by Darwin, and discussed the subjects, viewers and results for each of them. As the first set of recognition experiments in the history of psychology, it offers a frame of reference from which to view the subsequent developments to the designs of these tests. Chapter 4 then traced the developmental

practices used by Feleky and Fernberger in the stimuli of emotions (electric, introspective or false faces), such as whether information was provided on the viewers and what instructions were given to the viewers. Through this process, we highlighted and uncovered some important facts that are not included in the standard history. As Darwin asserts, the difficulties in studying expression often relate to the extremely fleeting and slight nature of facial expressions and the reactions of viewers in terms of imagination, sympathy, and so on. Feleky's use of recognition experiments involving photographs are discovered to have resolved one of the problems proposed by Darwin – the slightness of expression. The four photographs in Fig. 4.8 exhibit the initial states of amusement, surprise, suspicion and sadness, and received high-accuracy marks in Feleky's examination. Although ignored by previous scholarship, this should be credited as the first attempt to solve the problem raised by Darwin.

After being rejected by Darwin, the Piderit faces were not utilized in scientific practice for another half century, and were utilized in the recognition experiments for just six years: from the establishment of the Boring and Titchener model in 1923 to their last use by Fernberger in 1928. We learned some important facts about the model and its value in the standard history through tracing and reconstructing Fernberger's three experiments. First, we learned that Fernberger's attitude to the model changed between 1926 and 1928, with the unsatisfactory results he acquired in the successive experiments overturning his previous trust in the adequacy of the model. Second, we discovered some interesting facts about the value of the model for studying the suggestive effects of questions. This problem has received little attention in psychology research, but is an important factor relating to the validity of experimental results. Fernberger (1928) was the first to propose the existence of this problem in a scientific publication, but Darwin may also have noticed the phenomenon sixty years earlier. This can be seen by the fact that his working manuscript of 1868 clearly notes the change of the form of the questions from '*Is \* the right word to describe the expression?*' to '*What is the right word to describe the expression?*'. Unsatisfied with the simple 'Yes' answers that he received in the first columns, Darwin stopped providing the right answers, and asked the viewers to use their own words instead. Feleky, on the other hand, provided 110 emotive items for the viewers to choose from. Without citing these predecessors, the suggestive level in Fernberger's test was determined by whether the model was assembled in front of the viewers. Regretfully, the Piderit faces, as well as the problem of the suggestive effect of questions, were not further consulted in after recognition experiments.

Darwin separated his expressional study from physiognomy, and dedicated the *Expression of Emotions* to subsequent physiologists. The expressional science at the

turn of the century was still dominated by psychophysical doctrine, in the form of the James-Lange theory, and the associated laboratory practices used for studying the correlation between emotion and physical changes. For example, Feleky (1916) first focused on the phenomenon of respiratory movements amongst the numerous complex behaviours involved in emotional expression. As Brown (2005) points out, Feleky's later work (in 1922) helped to "shift psychologists' neurophysiological inquiries to cultural questions" (p. 57), as shown in the photograph of 'Religious feeling' in Fig. 4.7.

Taking educational and gendered factors into consideration, Buzby (1924) and Fernberger (1926; 1927; 1928) adopted a purely psychological approach. The increasing concerns of cultural and social factors in psychological investigations at last led to a new division of psychology – Social Psychology. This piece of history was perceivable through the institutional shifts within the psychology department of Columbia University. Klineberg's doctoral study at Columbia laid the foundation for his lifelong research in social psychology and, in addition to the psychophysical correlation seen with Feleky, our discussion has uncovered another interaction between psychology and other disciplines: the influence of anthropological methods and thoughts on expressional study. Supervised by Boas and inspired by his measurement of the head index, Klineberg was one of the first to consider how culture impacts on expression. Ekman (1970) and Bond (1993) both believe that Klineberg's article of 1938 is the only report addressing the cultural specificity of expression before the 1960s. I want to add that, if the questionnaire data on the cultural interpretation of expression – e.g. the answers from Swinhoe – had been fairly treated by Darwin, rather than selected to prove his belief in the universal nature of expression, research on this problem would likely have begun much sooner. This reveals how much ideologies and adherence to deeply valued hypotheses can influence scientific practice.

On this problem, the current study has amassed a number of interesting contrasts. Scholars' results and conclusions often significantly diverge from each other when they use the same methods but hold different beliefs. Darwin and Feleky both conducted recognition experiments on photographs, but differed in their aims. Apart from demonstrating the expressions, Duchenne's photographs were cited in the *Expression of Emotions* to legitimize the author's arguments on certain muscular movements. With presumed beliefs about the accuracy of Duchenne's photographs and what they would show, Darwin, in presenting the results of the recognition experiments, often overstated the positive or negative aspects of answers to justify his arguments. In contrast, Feleky used photography to record the expressions without



seeking to establish any prior hypothesis, so the results are plainly listed in the tables (see Appendix B) without summation or further processing. Feleky's discussions of the published photographs centered on the contrasts between the positive and negative answers without any alteration to the original data.

Mantegazza, Katherine Blackford and Klineberg all conducted ethnic surveys, but Mantegazza and Blackford were interested in physical features – the head size and the nose respectively – while Klineberg sought to explore cultural influences on expression. As a popular method in the trend of Scientific Racism, intelligence testing in turn helped Klineberg to end segregation polices in American public schools. The ideological differences on racial enquires can also be seen from the contrasts between Darwin's and Galton's use of questionnaires. With the hypothesis on racial universality, Darwin intended to present positive answers to the questionnaire while hiding racial variations. In contrast, Galton's questionnaire survey on genius was only sent to white families. Given his prejudice against black people, he intentionally ignored their achievements, and even advocated supplanting the back with other races.

Thus, this thesis, by rereading the data, research methods and conclusions of the relevant scientists, has helped to deepen our understanding about their achievements in particular, and contemporary psychological and social developments in this area more generally. For instance, Feleky's research on respiratory movements acknowledges the physiological trend in psychology that was led by the James-Lange theory. Klineberg's research helps us to understand the trend of Scientific Racism and the place that expressional study played in it. The notion of the hypothetico-deductive model has contributed to the study on both sides. At first, it helped us to appreciate the structure of the *Expression of Emotions* and the reasons for Darwin's selection of particular pieces of data. Moreover, it has also been useful for revealing the shifts of psychology at the turn of the Twentieth Century. For example, Feleky's introspection of emotions tested Bain's law of the revival of mental states: an instance of the experimental responses to the previous hypotheses raised by philosophical and empirical thinkers in this area. Our discussion has often benefited from historical and quantitative analysis. By classifying the data in relation to Darwin's three principles, we have made their origins clear, as well as their relationship with the study of the instinct. This has also helped to uncover the lack of equity in the exchange of specimens, information and finance in the Sino-British network. In general, the approach taken by this thesis has allowed us to examine the published ideas and arguments rather than just taking them for granted. Overall, I hope that the study has both shed light on Darwin's working methods on expression and established the link

between the *Expression of Emotions* and successive developments, such as the use of the literary approach by Darwin, and by subsequent scholars.

## Appendix

### Appendix A Coding the Asian Answers to Darwin's Questionnaire

Table A. 1 Answers from China, Malaysia and Philippines

	Robert Swinhoe in Xiamen, 5 Aug 1867; in Beijing, 4 Aug 1868	A.B. Meyer in Manila, Philippines 25 April 1872	F.F. Geach in Johor, Malaysia June 1867 April 1868 4 July 1868	C.A.J. Brooke in Sarawak, Malaysia 30 Nov 1870 30 Apr 1871
1.	P		N*	(PN*279)
2..	(P*317)		(P*317)	(N*318)
3.	(PN*248)		PN*	N*
4.	P		PN*	P_*
5.	(PN*208)		(PN*187)	N
6.	P		P*	(PN*213)
7.	(P252)		(P252)	N
8.	P		P	P*
9.	PN*			(NP*255)
10.	P		(P*261)	NP*
11.	P		P	P*
12.	P		P	(P*209)
13.	(N*269)		(PN*268)	N*
14.	P		P	(PN*233)
15.	P		N	P
16.	N*		P	N*
17.	P	(N*275)	P	(N*275,277)

Table A. 2 Answers from India and Sri Lanka

	John Scott	Erskine, H. N. B and West	Glenie, S. O. and Thwaites, G. H. K. Peradeniya in Sri Lanka
1	(P*) Bengalee, Hindustani John Scott linked astonishment with shame	P	
2	(N*) only in Sikkim Lepcha,	(P*) not below the neck	

	not in Bootan, Nepal, Tibet and Cabul		
3	(P*) Bengalees, many more than described in his query (N*) Mechis in Sikkim less erect and don't clench (N*) Lepcha in Sikkim	(N*) quivering frown	
4	N* seemed forget the question and totally from his own observation, Sikkim Lepcha, far more than described in query; Bengalees—Mussulmen & Hindoos, PN*	(N*)	
5	NP*; (P*) (PN*) a young Dhangar woman	(P)	
6	P* Bengalees	P	
7	(P+*)Bengalees	N	(P) but not often
8	(P*)	P	
9	P* Bengalees	NP no expiration	
10	(P+*)Ooreah	NP it has always been accompanied by fear or a desire to suppress any sign of emotion	
11	P+	P	P but more exaggerated
12	P*	P	
13	(P+*) Bengalees ,Sindars and Dhangar Coolies	(PN*)	
14	(P+*)	P	
15	P+*	PN	PN
16		NP 'ch'	
17	(N*)	(N)	P

Table A. 3 Answers from Australia and New Zealand

Lacy, Dyson on natives of Queensland	Hagenauer, F. A. from Lake Wellington	Smyth, R. B.	J. Bulmer from Melbourne	James West Stack from New Zealand on the maori
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1	(P*)	P		(PN*)	(PN*)
2	(PN*)	(N*)		(N*)	(P*)
3	PN*	PN	N*	PN*	(PN*248)
4	(P*)	P	N*		
5	N*	(PN*)		N*	
6	(PN*)	P	N*	PN*	(PN*213)
7	(PN*)			(PN*)	
8	(P*)	P		P	
9	(PN*)	P		P	
10	PN'			P	
11	(P*)	(P*)	(P*)		
12	(P*)	P		(P*)	
13	N	N*	N*	N*	
14	(P*)	P		P	(P233)
15	(PN*)	(PN*)		N	
16	P	PN*		PN*	
17	(PN*)	P		(PN*275)	

Appendix B Original Data in Feleky (1914)

TABLE I

Photograph	3	9	11	15	18	21	22	29	31	32	33	38	44	47	48	50	51	53	55	61	62	69	77	83
Modesty.....	22½					3		1																
Coyness.....	10		1			2		11										9						1
Coquetry.....	6				1			5										19						1
Contentment.....	2																							1
Earnestness.....	2½					1	1																	
Reproach.....	1							1																
Shyness.....	7																							
Uncertainty.....	1																							
Yearning.....	2																							1
Disgust.....					2						½	2		12½	1			16	8		6			1
Repugnance.....				1	5		1					1	5	2			1	14	1					1
Dislike.....			1		1				1	4			2	5	4			7	2		3			1
Annoyance.....			1	1	3½					3			1	1				4	8					
Loathing.....					2														4½	2½				
Aversion.....			½	1	6						1		½	5	1				2	2				4
Bored.....			2						1	1		1		1			5	2	1		4			
Sneering.....														2½				8	33		10½			
Scorn.....					1½			2						7	2		1	3	16		11			3
Contempt.....									1	1				2½			1	3	19½		21			2
Disdain.....			1											8			1	1	7		21			1
Haughtiness.....																					9½			
Superiority.....						1															2			
Snippy, superciliousness.....																					2			
Cynicism.....			1																		1			
Horror.....		2			3						35		9½		½	1	16½							
Terror.....					1						13		14			5								
Alarm.....					2½						3½	3		6		6½	2½							3
Fury.....											9			1			3							
Frenzy.....											1						1½							
Fright.....					2						1			7	12		2½							
Passion.....																	2							

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TABLE I.—Continued

Photograph	3	9	11	15	18	21	22	29	31	32	33	34	44	47	48	50	51	52	55	61	62	69	77	83
Suffering, physical					1						5	31½			3		3							
Suffering, mental										1	1	17	2	1	5	5	1							
Worry					2					3	8	8½	2		10	5			1					1
Anguish										1				2										
Despondent										1		2½			1	2								
Grief					1							1	2											
Pain											2	6	1	1	1		1		1					
Trouble										1		1												
Sorrow					1										½	3½								
Suspicion		2			6				1	2				1	1			1						31½
Antipathy										1				1	1	1½								2½
Distrust																								6
Jealousy										1														1½
Nothing											1	1												2
Timidity															1									7
Watching																								2½
Doubt		1	1								1													1
Self-abasement																								1
Laughter											3													40
Ecstasy																		3						11
Glee																		1						17
Merriment																								10
Mirth																								2
Rapture																			2					6½
Reverence																								25
Religious																								15
Religious love, faith, etc.																								25
Aspiration																								1

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TABLE I.—Continued

Photograph	3	9	11	15	18	21	22	29	31	32	33	34	44	47	48	50	51	52	55	61	62	69	77	83
Love										1								6						
Pleasure										½								8						
Playful										1								1						
Smiling					1		2											3						
Self-satisfaction																		2						
Desire																	1	1						
Tenderness		2				1		10		18								1						
Sympathy		5		1		½		7½		14½		1			1		9½							
Pity		3				1				10						½	5							
Comforting a child										2														
Cajoling										4														
Chiding										2														
Love's trustful, maternal										2														
Pleading										2														
Persuasion										2														
Soothing capability										2														
Attention		2	5	15		13			4½			2			1		½	1						
Calmness		1																						
Calculation											1	2												1½
Curiosity																								½
Reflection																								1
Sadness																								1
Deep, penetrating thought																								
Amazement			13						9			2	4½		1		1	3						
Astonishment			13						10½			½					2	1½						
Surprise			30						52			2	2				2	2½						
Wonder			14						12															
Awe			6						2			2	1	1	2									1
Admiration			4						1															

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TABLE I.—Continued.

Photograph	3	9	11	15	18	21	22	29	31	32	33	38	44	47	48	50	51	52	55	61	62	69	77	83
Determination			2						23								1							
Assertion of will power									1								1		1					
Bitterness				3					5	1		2		2						1				
Displeasure		1		2					8	4			1	1	5				4		1	1		
Defiance				3					4	1	1			5			2			1	1			2
Disapproval									2															1
Firmness									8	3														1
Hardness									3	2			1	2	1									
Resolution									6	2														
Self-assertion									1					1										
Sternness									3															
Despair					1											1	1							1
Dismay					1		2		4	1	1	3		1	8	4								
Distraction					1				1		1				10	1								
Bewilderment															2									
Hopelessness											1			1	1			1						
Perplexity									2		1			1	3									
Racking brains															1									
Thought	3	4		3					4						5									1
Anger					1				7	9	1	8	1				9							1
Hate					1				1						8		3			1				
Hatred									1											1				
Indignation									2	1							2							
Dissatisfaction																	1							
Hurt		1									1													
Irritation		1			1				1	4				2	5				3					
Rage		1			4				1	4		4	1				9							
Puzzled										2														
Ugliness														1										

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