

Management & Organizational History

<http://moh.sagepub.com/>

Frank B. Gilbreth, Walter C. Camp and the World of Sports

Arthur G Bedeian

Management & Organizational History 2012 7: 319

DOI: 10.1177/1744935912457619

The online version of this article can be found at:

<http://moh.sagepub.com/content/7/4/319>

Published by:



<http://www.sagepublications.com>

Additional services and information for *Management & Organizational History* can be found at:

Email Alerts: <http://moh.sagepub.com/cgi/alerts>

Subscriptions: <http://moh.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Citations: <http://moh.sagepub.com/content/7/4/319.refs.html>

>> [Version of Record](#) - Oct 31, 2012

[What is This?](#)

Frank B. Gilbreth, Walter C. Camp and the World of Sports

Management & Organizational History

7(4) 319–335

© The Author(s) 2012

Reprints and permission:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/1744935912457619

moh.sagepub.com

**Arthur G Bedeian**

Louisiana State University, USA

Abstract

This paper recounts the pioneering roles played by Frank B. Gilbreth and Walter C. Camp in using motion pictures to chart the swings of early twentieth-century golf champions. Drawing on personal correspondence between Gilbreth and Camp, and rarely accessed published materials, it reveals the heretofore untold events leading to the publication of the first motion studies of golf. Together Gilbreth and Camp – the ‘Father of Motion Study’ and the ‘Dean of American Sports’ – combined their talents to influence the world of golf in a manner that is yet evident today.

Keywords

Baseball, fencing, golf, motion study, sports film

Introduction

The manner in which events develop and personalities interact is, in general, unpredictable. Whereas historians chronicle and interpret momentous developments of the past, the bulk of history is comprised of ephemeral events that vanish with time and are forgotten. The present paper recounts the events surrounding the little-known collaboration of two personalities that played leading roles in their respective fields. In doing so, it documents an ephemeral episode in the intersection of management history and sports that carries continuing significance for the world of golf as it is played today.

The exact sequence of events is unknown. What is known, however, is that in a letter dated Friday, 31 October 1913, Lillian M. Gilbreth wrote to Walter C. Camp, the legendary ‘Dean of American Sports’, to the effect that ‘Mr. Gilbreth has instructed me to tell you that he expects to attend the meeting of the American Society of Mechanical Engineers, at New Haven, November 19th, and that he hopes to have the pleasure of meeting you then.’¹ The second and final sentence of this letter reads: ‘Mr. [Fred] Taylor has told him of your interest in the application of micro-motion study to athletics.’² Taylor, the widely acclaimed ‘Father of Scientific Management’, was also an accomplished sportsman, having won amateur titles in both golf and tennis (Taylor and Bedeian 2007, 2008).

Corresponding author:

Arthur G. Bedeian, Department of Management, Louisiana State University, Baton Rouge, LA 70803-6312, USA.

Email: abede@lsu.edu

The letter in question, with its introductory reference to Taylor, is typed on letterhead simply captioned 'Frank B. Gilbreth, 34 West 26th St., N. Y.'. Presumably, Camp was aware of the Gilbreths' devotion to the elimination of waste (wherever they found it) and their 'Quest of the One Best Way' of doing work, as he would later refer to Frank Gilbreth as 'one of the great efficiency experts of the manufacturing world' (Camp 1917: 23). At the time, Camp was the president and treasurer of The New Haven Clock Co., and nationally known as 'an apostle of fitness and of the wish to excel' (Martin 1961: 80). He was also permanent secretary of the National Collegiate Athletic Association, celebrated for his perennial All-America selections in various sports, and the author of numerous sporting books, including *Drives and Puts: A Book of Golf Stories* (Camp and Brooks 1899).³

Gilbreth's hoped-for November meeting with Camp evidently never took place, for on 18 May 1915, Camp wrote to Gilbreth, noting:

I remember a year or two ago having a little correspondence relative to the application of micro-motion study of athletics, especially in regard to timing. I was sorry not to have had the pleasure of meeting you then. Any time you are passing through [New Haven, CT] you might let me know.

In concluding this letter, Camp wrote: 'I suppose you felt as saddened as did I on learning of the death [on 21 March 1915] of our mutual friend Taylor? I saw him at Atlantic City early in the Fall.'

Camp's letter brought a response the next day (19 May 1915) from Lillian stating: 'Mr. Gilbreth is at present abroad, but we expect him back early in July. I know he will be delighted to call upon you again, the next time he is in New Haven.' In turn, Lillian noted: 'Dr. Taylor's death was a sad blow to us all. Mr. Gilbreth has been abroad since early March, and was, therefore, unable to be at Dr. Taylor's funeral.' Reference to Taylor's passing as a 'sad blow' is noteworthy given the well-known estrangement, beginning in 1912 and culminating in 1914, between Taylor and the Gilbreths, as a result of Taylor arranging for H. King Hathaway to assume a consulting contract that Frank Gilbreth had secured with Herrmann, Aukam, a South River, New Jersey, handkerchief-manufacturing company (Wren and Bedeian 2009: 173). In closing her 19 May letter to Camp, Lillian expressed the hope that she and Frank might 'have the pleasure' of welcoming Camp in Providence (Rhode Island), the location of the Gilbreths' home.

A first meeting and new refinements

Over a month later, in follow-up correspondence dated 30 June 1915, Frank Gilbreth wrote to Camp stating that he had just returned from Europe to find Camp's 18 May letter, and that he had 'many new refinements for the timing and motion study of athletics, and also for the workman'. Gilbreth further noted that he had an appointment in New Haven in the 'near future' and, if Camp set a time, he would arrange to meet with Camp on the same day. After an exchange of letters in which Camp indicated he would be away for most of July, Gilbreth and Camp finally agreed to meet in New Haven on Friday, 10 September. Although there is no written record of what transpired at this meeting, the following day, Gilbreth wrote to Camp indicating: 'In accordance with my promise I am sending you some pictures that will explain to you the methods of timing athletics and workmen.' Gilbreth continued: 'After you have had time to think over these pictures thoroughly, I think we might be able to do some timing that would give us new laws, underlying the science of motions of the athlete and the worker.' Gilbreth enclosed 10 photographs, including two chronocyclegraphs of an 'expert fencer'. Chronocyclegraphs were a Gilbreth invention that isolated the elements that compose a complete cycle of motions. The two chronocyclegraphs that Gilbreth sent

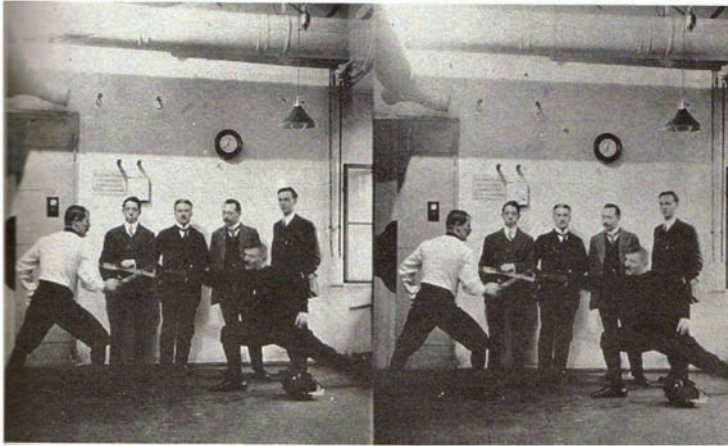


Figure 1. Two photographs showing a thrust and parry, 15 January 1914

Source: 'N' file 12/0031-18, Frank and Lillian Gilbreth Collection, Courtesy of Purdue University Libraries, Karnes Archives & Special Collections. Used with permission.

Camp were created by attaching small electric lights to the dominant hand and the point of the fencer's sword. By analysing the 'light track' recorded on photographic film, Gilbreth was able to determine the precise path of the fencer's motions, as well as calculate the time occupied in each separate movement.

In late 1913 and early 1914, while in Germany, Gilbreth had previously shot a series of images that featured two fencers engaged in friendly combat (Figure 1). Recognizing their publicity value, Gilbreth referred to the images as a 'visual calling card'. Indeed, Gilbreth was successful in using the photographs to garner a meeting with Germany's Kaiser Wilhelm III (Brown 2005: 102).

Touché: Marey (1885), Muybridge (1888) and Scripture (1894)

In filming swordplay, Gilbreth was following in the footsteps of several predecessors. French physiologist Étienne-Jules de Marey is, perhaps, the most well-known of this group. Marey's 1885 heliogravure, 'A Sword Thrust', is composed of successive images – taken 50 per second – on a single plate (Figure 2). Marey had calculated the speed of a foil in a straight thrust to be 3.12 m (10.24 ft) per second (Amar 1914/1920: 438). A fragment from an 1891 Marey film of two fencers may be viewed at <http://video.google.com/videoplay?docid=-1513818072801728606#>

Anglo-American Eadweard J. Muybridge (University of Pennsylvania 1888) and Yale University psychologist Edward W. Scripture (1894) had, likewise, used a series of photos to freeze and analyse the motions of fencers. Muybridge also pioneered in studying other athletes, including men catching and kicking a football, batting a baseball, swinging a bat and serving a tennis ball, as well as women picking up and throwing a baseball. Unlike the subjects in Gilbreth's motion studies, however, those in Muybridge's photographs are pictured *au naturel*. An animation of Muybridge's study of fencers' motions can be viewed at <http://www.youtube.com/watch?v=3qYiL4hH5I>

Scripture, anxious to show the practical relevance of his work, was interested in showing that experimental psychology was applicable to everyday life (Goodwin 2009: 79). He saw athletics as a prime example and studied the reaction times of runners, boxers and gymnasts. His research into



Figure 2. 'A Sword Thrust', 1885
Source: Marey (1894: 173).

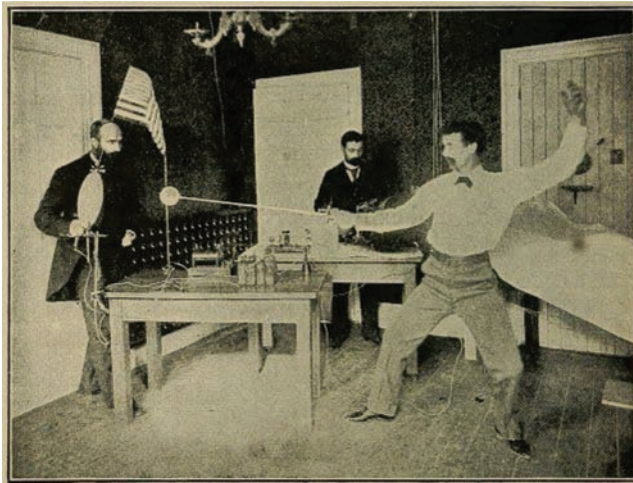


Figure 3. Measuring mental and muscular time in fencing at the Yale Psychological Laboratory, New Haven, CT
Source: Scripture (1894: 56).

the reaction times of fencers was first reported in his in-house journal, *Studies from the Yale Psychological Laboratory* (Figure 3). As Scripture and Camp were contemporaries at Yale, and Scripture's work at the Psychological Laboratory is mentioned in a volume co-authored by Camp (Welch and Camp 1899: 304), there is some basis on which to presume that Camp was familiar with Scripture's activities.⁴

Although there is no record that Gilbreth was aware of Scripture's prior work, the Gilbreths publically acknowledged Muybridge's and Marey's motion studies as early as 1915 in a paper titled 'Motion Models: Their Use in the Transference of Experience and the Presentation of Comparative Results in Educational Methods', presented at the annual meeting of the American Association for the Advancement of Science (Gilbreth and Gilbreth 1915: 115). Others had

already noted the parallel between Marey's and the Gilbreths' work. In an early comparison, Talbot (1913: 112) commented that Marey's 'system of timing motions it may be pointed out has been revived in a similar form by Mr. Frank Gilbreth in connection with "micro-motion" study'. Writing somewhat later, citing Marey's previous work, Lahy (1916: 36) noted that Gilbreth's '*procédé n'est ni nouveau, ni original*'. Ioteyko (1919: 63) likewise wrote that Gilbreth 'has gone back to Marey's chronophotographic process'.

The Gilbreths, however, viewed Marey's work as impractical, as it did not 'record the direction of motions photographically' (Gilbreth and Gilbreth 1916a: 475). In contrast, as they explained, their chronocyclegraphs showed 'the paths of each of several motions made by various parts of the body and their exact distances, exact times, relative times, exact speeds, relative speeds and directions' (Gilbreth and Gilbreth 1916b: 121). Kern (1983: 117) underscores this distinction, noting that whereas 'Muybridge and Marey were searching for a way to make moving pictures', Gilbreth used the motion picture camera to break down and reconstruct work processes. Thus, as Mandel (1989: 9) maintains, although Muybridge and Marey were the first to 'identify and catalog human motion', it was the Gilbreths who specifically designed motion studies for 'the sake of economic advantage'.

In her husband's defence, Lillian maintained that Frank was unaware of either Muybridge's or Marey's motion studies 'until his work was well developed' (quoted in Braun 1995: 423).⁵ Records do indicate that Frank Gilbreth received a copy of *Animal Locomotion: The Muybridge Work at the University of Pennsylvania* (University of Pennsylvania 1888), a gift in 1911 (Brown 2005: 256), and that he also owned an 1895 English translation of Marey's 1894 book *Le Mouvement* (Hepburn 1947). An inscription in the later book indicates that it was purchased by Gilbreth in London on 12 July 1913 (Brown 2005: 88). Braun (1995: 347) reasons, however:

Because Gilbreth took out a patent on every device he used for motion study, and because he stood to gain financially as much from his patents as from his consulting jobs, it was not in his interest to admit that any parts of his system had been anticipated.

The Giants versus the Philadelphia Phillies

It is likely that Camp was aware of Gilbreth's interest in applying 'moving pictures' to the study of sports through the Gilbreths various attempts to win publicity and, thus, build wider interest in their work. In early 1913, Frank had filmed the hometown Brown University baseball and track teams (Brown 2005: 102). Subsequently, he was invited by the *New York Tribune* to study the New York Giants baseball team in an effort to 'discover the fundamental laws of human motion' (Anonymous 1917b: 227). In tests prior to a 31 May 1913 game between the Giants and the Philadelphia Phillies at the Polo Grounds, which the Giants won 3–2 before 20,000 fans, Gilbreth determined that it took 0.288 seconds for a ball to travel from Giant pitcher Arthur H. Fromme's fingers to the time it was struck by a batter (Anonymous 1913) (Figure 4).

Such demonstrations were depicted in the popular press as a natural extension of the emerging efficiency craze (see, e.g., Kelly 1920). A segment of the Gilbreth Polo Grounds motion study is reproduced in the 'The Original Films of Frank B. Gilbreth, Part 2' (1944). Prepared by James S. Perkins, Lillian M. Gilbreth and Ralph M. Barnes, in collaboration with the Chicago Chapter of the Society for the Advancement of Management, this film may be viewed at <http://lucian.uchicago.edu/blogs/sciencefilm/human-sciences-on-film/human-movement-3/frank-gilbreth-films/>

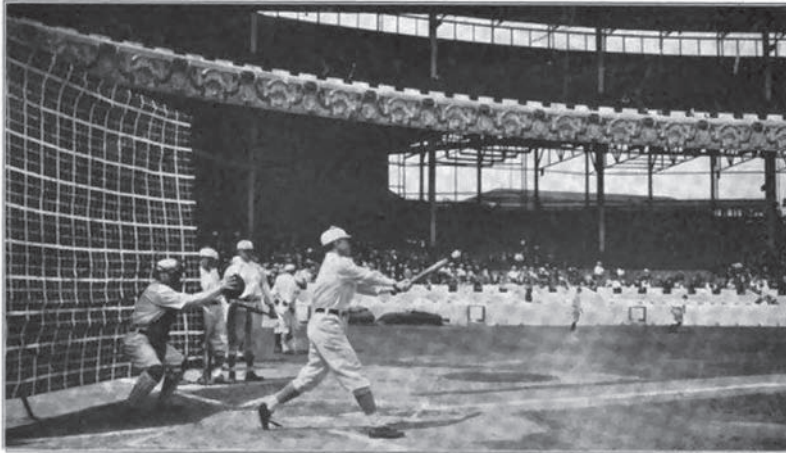


Figure 4. Studying the motions of the ‘Giants’ at the Polo Grounds, New York, NY, 31 May 1913
Note the measured cross-sectioned screen to ascertain the length of individual movements.

Source: Townsend (1916: 325).

‘There Must Be a Misunderstanding’

It seems that at first Camp did not quite appreciate the intent of the 10 photos he received from Gilbreth. Writing (20 September 1915) to acknowledge receipt of the photos, Camp expressed his confusion:

I am sorry but I think there must be a misunderstanding. What I had in mind was a picture timing a track man – a picture of the clock and the way it is done. These pictures that you sent are, of course, very interesting to me because I happen to be a manufacturer, but they would not, I am afraid, make much impression upon the general sporting public, and that is the way to start the thing off.

In responding a week later (27 September 1915), Gilbreth replied that he had loaned all his sports film to a ‘very persuasive gentleman’, but would have them returned ‘as soon as possible’. He added, that whereas he presently had no other sporting pictures to send, ‘the method is shown, I think, in the pictures I did send you’. Based on available records in the Camp and Gilbreth archives at Yale and Purdue Universities, respectively, further communication between Camp and Gilbreth took place a month later when on Tuesday, 30 November 1915, Camp telegraphed inquiring as to whether Gilbreth could come to New Haven to discuss ‘the matter we talked [about] last spring’. In reply, Lillian telephoned Camp and made arrangements for Camp to meet Gilbreth at the New Haven train station on 3 December, after which they would lunch at the Graduates Club.

33-1/3, 33-1/3, 33-1/3

What transpired at the Camp–Gilbreth meeting may be inferred from a letter Camp penned to Gilbreth later the same day (3 December 1915). In opening the letter, Camp writes:

I think that the way to divide the proposition on this newspaper work would be in thirds, that is, 33-1/3 to you for the pictures, 33-1/3 to me for writing and 33-1/3 to Wood for placing it and rounding up of men we avail.

The 'Wood' being referenced is Otis F. Wood, a New York City advertising agent that Camp had employed in the past to promote and syndicate his work in the popular press. The following day (Saturday 4 December), Wood duly wrote to Gilbreth indicating that he would be pleased to visit Providence on Wednesday morning next (8 December) to discuss the proposed newspaper work.

On 6 December 1915, prior to Wood's planned visit, Gilbreth wrote to Camp informing him that he had contacted local Brown University All-America quarterback, W. Earl 'Bill' Sprackling, and Connecticut and Rhode Island state-amateur champion golfer Roger N. Hovey, then also of Providence, and that both had agreed to participate in making 'motion studies and cyclegraph records'. Gilbreth noted that Camp's proposed 1/3-1/3-1/3 'division of spoils' was acceptable for 'newspaper work', but not 'films for motion picture theaters, as there would be added expenses associated with furnishing film and that he would expect to have these costs covered.' In a letter also dated 6 December, Camp offered that 'under no circumstances will we do anything with the motion picture rights or releases until we have studied the field more thoroughly.' In a 13 December reply to Gilbreth's 6 December letter, Camp also added that Gilbreth's costs would 'certainly' be covered before any division in proceeds.

Camp and Gilbreth had thus agreed to collaborate on a series of weekly articles dealing with 'efficiency' as applied to athletics. The articles would provide instruction in golf, baseball, tennis, track and other sports. Each article would feature 'photographic illustrations' of Gilbreth's 'stereographic' and camera work, as well as text prepared by Camp (letter from Wood to Gilbreth dated March 1916). As the above reference to 'films for motion picture theaters' suggests, Camp and Gilbreth had also agreed to collaborate on a separate series of similarly themed movies to be shown nationally in local theatres. Both the articles and movies would feature champion athletes who would serve as models for others to emulate. The idea of producing films to be shown in theatres may have been promoted by a 15 July 1914 article in the *New York Times* reporting on a 'private exhibition of moving pictures of the recent metropolitan and British amateur championships' that were shown at the Knickerbocker Theatre (Anonymous 1914: 7). Directed by Louis Livingston, a member of the New York Stock Exchange, the movies were evidently well received, but nonetheless judged to be a one-off event 'owing to objections on the part of some of the players and the difficulties encountered in the taking' (Anonymous 1914: 7).

As reported in the magazine *Popular Science Monthly*, the central message of the Gilbreth-Camp articles was to be straightforward: 'To become a champion yourself you must learn from a champion' (Bannard 1920: 44). There was one catch, however: 'Very few champions are good teachers in the sense that they can tell what to do and how to do it. Often, they have entirely wrong theories about their own procedure.' As Gilbreth's cyclegraphs revealed, all too often 'a champion does not know why he is a champion' (Bannard 1920: 45). Thus, in response to this 'astonishing fact', it was announced that the 'best fencers, the best baseball-players, the best golfers have permitted Gilbreth to cross-examine them' with his invention, the cyclegraph (Bannard 1920: 45). As explained, it was Gilbreth's theory that 'all manual work, whether it is a surgeon's, a bricklayer's, or a tennis-player's, is alike in this: It possesses a fundamental rhythm' (Bannard 1920: 45). Furthermore, Bannard (1920: 45) stated:

The natural laws and underlying principles resulting from the design, selection, standardization, care, and use of tools can be discovered as surely as mathematical laws, and these laws are the same for all tool-users, all trades, all outdoor games.

As the Gilbreths so often expressed, of the various ways to do a job, only one was the best, and it was their goal to find it (Bedeian 1976). To commence the series of planned articles, golf was selected as the initial offering because, as Camp (1916: 63) was later to explain:

In golf, perhaps more than in any other sport, it will be possible to use... methods of photography... for the improvement of students at large, for there is no game in which a correct form means so much as it does in golf.

The choice of golf as the initial offering may have also been influenced by the fact that Camp was not only an avid low-handicap golfer (Glass 1934; Phelps 1930) who had written on the history and etiquette of golf (Camp 1910a), a sport he recommended for both men and women (Camp 1910b), but he had patented an arm brace intended to prevent golfers from slicing their shots (Anonymous 1905). Whereas Camp was a student of all athletics, the only exercise Gilbreth ever took was sailing (Lancaster 2004: 144), a rather inconvenient sport to film. Furthermore, only two years before, golf had gained a foothold in the USA when 20-year old ex-caddy Francis Ouimet had won the 1913 US Open Championship, defeating British professionals Harry Vardon and Edward 'Ted' Ray, two of the world's foremost golfers. Ouimet's astounding victory has been described as being 'responsible for the great awakening of golf in America' (Grimsley 1966: 281). Prior to that time, golf had been considered an exclusive pastime of the idle rich. Ouimet, the first amateur to win the US Open, emerged a national hero and public interest in golf boomed (Frost 2002).

Moving ahead

Whereas there is apparently no evidence indicating that Camp and Gilbreth's plan for a series of sports movies was ever fulfilled (Brown 2005: 261), action on the planned series of articles featuring sports champions went ahead as intended. On 22 December 1915, Gilbreth sent Camp a copy of the film that he had taken at the Polo Grounds. Just over a month later, on 28 January 1916, Gilbreth wrote to Camp that earlier that day he made some 'remarkable' chronocyclegraphs of Hovey, and that he hoped to obtain additional pictures of Hovey, as well as Sprackling, during the next week. Gilbreth then went on to add an unexpected twist:

Regarding the making of these pictures: I think it would be stronger if the first pictures went out without any idea of a Camp-Gilbreth combination. It would seem to me that your articles would be stronger and would bring more attention, if you should write them as coming from you, who had used the remarkably efficient measuring devices of a certain man named Gilbreth.

The unstated reason underlying this twist would be revealed some months later.

By mid-March 1916, Camp had drafted a preliminary instructional manuscript on golf, and in a 10 April letter to Gilbreth indicated that he wished to 'work it up more fully' and place it either with a newspaper syndicate or a magazine such as *Vanity Fair*. In the following weeks Gilbreth arranged to take chronocyclegraphs of 1912 Olympian middle-distance runner Norman S. Taber and Brown University's short-stop, George M. 'Kid' Crowther. Finally, on 28 April Camp informed Gilbreth that he intended to contact *Vanity Fair* editor Frank W. Crowninshield in an effort to get him to accept their golf manuscript for publication.

The World's Work

Perhaps beginning to feel a bit impatient with the progress of their collaboration, in a letter dated 1 May 1916, Gilbreth wrote to Camp that he had given 'some of my golf and baseball pictures to a writer [Reginald T. Townsend] on "The World's Work", who is going to put them in an article on "Industrial Efficiency".' Offering that the 'more publicity we have the better', Gilbreth inquired as

to whether Camp would be willing for Townsend to use any of the golf pictures that he had taken for use with his own work. Camp responded three days later saying, 'I think it would be a mistake to have any athletic pictures used' in the *World's Work* article 'as it would somewhat take the edge off ours when they come along. That is my opinion and you can take it for what it is worth.'

The Townsend article appeared in the July 1916 issue of *The World's Work*, and although it did not contain a golfing shot among its 37 photos, despite Camp's expressed reservation, it did include a photograph taken from the 1913 pre-game micro-motion study of the New York Giants and two chronocyclegraphs of 'the path of light made by the rapier of the champion fencer of the world' (Townsend 1916: 331). Echoing the central message of the series of articles that Camp and Gilbreth were pursuing, Townsend (1916: 331) noted:

Mr. Gilbreth believes that skill in all trades, in all forms of athletics, and even in such professions as surgery, is based on one common set of fundamental principles – the principles of economy of effort and rhythm of motion. In other words, all champions belong to the same breed – they unconsciously use exactly the same methods to achieve their exceptional results.

By 22 May 1916 Gilbreth's impatience with the pace at which the agreed-upon series of sports articles was progressing had become palpable. Writing to Camp he expressed his frustration:

It seems to me that if we are ever going to do anything on golf that we should get started pretty soon. Personally I must admit that I lose my interest if the time between the use of pictures and the taking of pictures gets very long. I think it is a hard job to keep one's interest up to the boiling point on an experiment that has long since been finished.

Two days later, Camp wrote to Gilbreth saying that he had just received Gilbreth's letter dated 22 May, and that he had spent the day before with Crowninshield and 'the *Vanity Fair* people'. Despite requesting clearer pictures of a more general interest to be taken by a professional photographer, Crowninshield had agreed to give Camp two pages in the upcoming August issue of *Vanity Fair* to be released on 20 July.

Correspondence between Camp and Gilbreth regarding pictures to accompany the forthcoming *Vanity Fair* article continued throughout the remainder of May and into June. In a letter dated 10 June 1916, Camp indicated that Crowninshield 'was quite strong against using any [photographs] of Hovey on the grounds that they were unclear.' Crowninshield wished to only include photos of noted professional Scottish golfer, Gilbert Nichols. In an earlier letter dated 2 June, Gilbreth expressed the hope that pictures of Hovey would not be left out 'because he cooperated with us so thoroly.'⁶ Camp shared Gilbreth's feelings and, after pressing the issue with Crowninshield, expressed the belief that one or two photos of Hovey would be included. Accordingly, Camp requested that Gilbreth send half a dozen better prints showing Hovey's golf swing.

Growing impatience

By 1 July 1916, Gilbreth once again voiced his impatience, writing to Camp and saying:

Now once more, my oldest boy is five years old, and I am telling him each day about the wonderful article that some day will come out in "*Vanity Fair*". Do you think he will see it during his natural life?

Camp responded on 3 July:

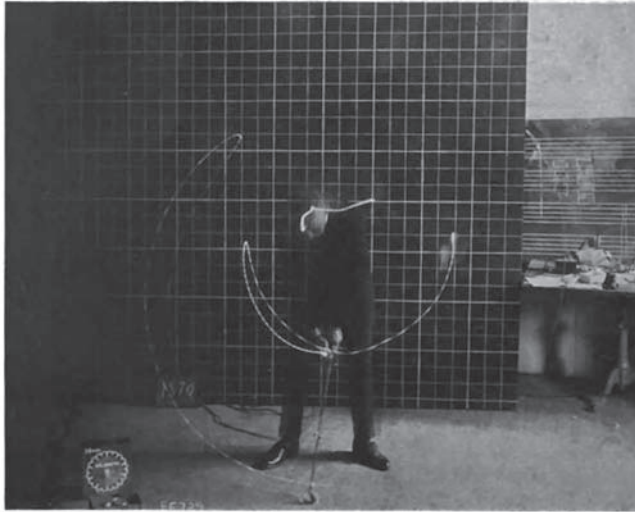


Figure 5. The swing of champion golfer Gil Nichols, with his head, right hand and the end of his club outlined

Note the special clock, or chronometer. The hand on the clock makes 10 revolutions a minute. Its dial has 100 divisions, each of which, thus, represents 1/1,000 of a minute.

Source: McKillop and McKillop (1917: 88).

Tell your oldest boy that so rapidly have I rushed the matter for *Vanity Fair* that they could not even send me a proof to correct and it will appear in their August number which comes out I think the latter part of July. In order to get it into that number I personally went down and worked over it with the editor.

On 24 July 1916 Gilbreth wrote to Camp requesting return of ‘the baseball film and others’. On a line below his signature, a typed addendum simply reads: ‘The article in “*Vanity Fair*” is OK.’ Apparently not satisfied with the progress of their collaboration, one week later, on 31 July, Gilbreth once again wrote to Camp and opened:

I do not know whether or not it is your intention to immediately write another article on golf, but I would suggest that you use up the material you have on hand as soon as possible, as I desire to make a new set of pictures as soon as possible which will show other things which have never been shown in golf before.

Camp did, indeed, intend to write other articles on golf. The initial August 1916 *Vanity Fair* article featured five chronocyclegraphs showing Nicholls’s swing with different clubs (Figure 5), as well as two additional photos of Hovey, as Camp and Gilbreth had requested. Camp (1916: 63) assured readers:

It ought not to be long before we shall be able to see, in moving cyclograph pictures, the best exponent of any department of athletics at his chosen sport, and, by the aid of such pictures, to study his methods and discover how to achieve his results.

Perhaps softening a bit, on 2 August 1916 Gilbreth wrote to Camp: ‘I am receiving many compliments about your article in “*Vanity Fair*”. I, also, think it is very fine.’ Camp followed up with a second article in the January 1917 *Vanity Fair* that featured photos of film strips of both Nicholls’s and Hovey’s (Figure 6) golf swings. The first of their kind, the photos are original forerunners of



Figure 6. Roger Hovey swinging a cleek (about a two-iron)
Source: Camp (1917a: 72).

the swing sequences that appear almost monthly in contemporary magazines such as *Golf Digest* (see, e.g., <http://www.golfdigest.com/golf-instruction/swing-sequences>).

Golf Illustrated

Continuing in his pursuit to place other articles in the planned Camp–Gilbreth series, Camp wrote to Gilbreth on 22 August 1916, saying that he had made an appointment with the editor of a golf magazine, but had first wished to have their second *Vanity Fair* article in print before moving ahead. Nearly a month later, on 18 September, Camp revealed in a letter to Gilbreth that the editor in question was Max Behr, influential golf-course architect and first editor of *Golf Illustrated*. On 26 October, Camp informed Gilbreth that he had met with Behr. Correspondence between Camp and Behr continued through November 1916.

On 11 December 1916, Gilbreth wrote to Camp with a request that shed light on the unusual twist wherein Gilbreth, who had earlier considered his chronocyclegraph images to be ‘visual calling cards’, had suggested that it would be best if the first golf pictures went out with no hint of a Camp–Gilbreth collaboration. He writes:

Now I have only one special request to make and that is this: Your article in “Vanity Fair” was so good that I have heard from a number of sources that I am taking my mind off my work and putting it on the subject of Champions in general and Golf in particular. This, of course, is not very stimulating for the securing of new business, not reassuring to my present clients, and I hope, therefore, that you will lose no opportunity to make it very plain that my real work is that of Consulting Management Engineer and nothing else, and that this work on Golf, etc., is my play. I guess you understand the idea, so I’ll leave it to you.

To this Camp replied on 14 December (original emphasis): ‘I note what you say about your *work* and your *play* and appreciate that situation personally, and I will see that the [second *Vanity Fair*] article has that bent.’

With the appearance of the second *Vanity Fair* article in late December 1916, Gilbreth was not pleased. On 28 December, he wrote to Camp stating:

‘I saw this month’s [dated January 1917] “Vanity Fair” and was greatly pained to see the way our name was mentioned in connection with the moving pictures of golf. This certainly looks as though we had gone into the motion picture business, and I hope that you will use every effort to see that in the future nothing is said that would give the public the idea that we are doing any work outside of Management and Motion Study and that, under no consideration, do they get the idea that we are producers in moving picture lines. Such an impression would be very detrimental to our interests. On the other hand, there would be no harm whatever in having our name left out entirely in any such account.’

Camp responded two days later:

Yours of the 28th is at hand, but you did not stop to think that this article in *Vanity Fair* was written long before you mentioned to me the fact that you did not want your name coupled up so strongly except in the line of motion study. Unfortunately neither your nor my efforts can change the type after they have been set and run. I am certainly bearing it in mind in the future articles.

The future articles that Camp alluded to appeared in the February and April 1917 issues of *Golf Illustrated*. Camp is given the byline in the first of these articles, titled ‘Charting the Golf Swing’, with Gilbreth’s name appearing in smaller subsidiary type. This subheading reads: ‘The adventures of Frank B. Gilbreth, the great efficiency engineer and chartographer of human motions, in the



Figure 7. Champion golfer James M. 'Long Jim' Barnes hitting a drive
Source: Gilbreth (1917b: 23).

Realm of Golf.' The article features an analysis, with five chronocyclegraphs, of English golf professional James M. Barnes's championship swing. Camp's name, however, is absent from the second article in this two-part series. Published under the title 'Motion Pictures of James M. Barnes, the Professional Champion of America, Making a Drive', it consists of 35 sequenced frames of Barnes's full swing, with his shadow highlighted against a measured cross-sectioned screen to ascertain the length of individual movements (Figure 7), without any accompanying narrative. Barnes, nicknamed 'Long Jim' for his height (6 ft 4 in) and long hitting, was the reigning US Professional Golf Association champion.

There is no record of Gilbreth objecting to the prominence or placement of his name in either *Golf Illustrated* article. As Gilbreth feared, however, he was taken to task in an unsigned editorial, likewise titled 'Charting the Golf Swing', that appeared in the March 1917 issue of *Golf* magazine, the self-proclaimed 'Oldest Golf Publication in America'. Playing to Gilbreth's concern that his involvement with sports might cast doubt on the seriousness of his commitment to management and motion study, the editorial opens with the following indictment: 'If Frank B. Gilbreth, the great efficiency engineer and chartographer of human motions, cannot show any more practical results in his business "stunts" than he does in "charting the golf swing" we shall not have him in our factory' (Anonymous 1917a: 164). Further, referring to Gilbreth's work as 'weird-looking', it challenges the contention that his chronocyclegraph images illustrate that, in taking his swing, Barnes's wrist action accounts for his club not going up and down on the same path. The editorial dismissively notes that Gilbreth's 'funny photo-diagrams' show:

as we already know, that in the downward swing the player generally moves his body forward. This has the not unnatural result of bringing his hands further forward with the perfectly reasonable corollary that the downward arc is nearer to the hole than that of the upward swing. (Anonymous 1917a: 164)

Gilbreth's concern for the perceptions of his consulting clients is understandable, in that this was the Gilbreths' principle source of revenue. It is nevertheless interesting to speculate how Gilbreth missed the potential benefits of a client base drawn from professional athletic teams that would possibly pay well for services promising to increase their efficiency and effectiveness. Of course, at the time, athletics was not yet the 'religion' it is today.

Whatever the reality

The second in the two-part series of the *Golf Illustrated* articles (published in April 1917) seems to have been Camp and Gilbreth's final joint foray into the world of sports. On 6 April 1917 the USA formally declared war against Germany and entered the conflict in Europe. The following day, Gilbreth was in Washington, DC, to volunteer his services as an efficiency expert (Yost 1949: 266). Commissioned a major in the Engineers Officers Reserve Corp, he was charged with finding the most efficient means for assembling a Browning machine gun and, thus, reducing the time necessary for training. He also made training films on subjects such as the proper way to groom a mule and how to use a bayonet and throw a grenade (Lindstrom 2000: 740). Camp was similarly called upon to develop a physical-fitness regimen for naval recruits. Featuring a series of 12 exercises, known as the 'daily dozen set-up', it was adopted by both the United States Army and United States Navy (Camp 1925). It is still in use today.

Writing a year later in the March 1918 issue of the magazine *The Winged Foot*, published by the New York Athletic Club, of which he was a member, Gilbreth (1918) recounted his two-plus-year involvement with Camp. In what best might be described as a stylized version of actual events, with *Vanity Fair* editor Frank Crowninshield's name changed to Frank Trowbridge for some inexplicable reason, Gilbreth related how his 'good friend' Walter Camp asked him to make some motion studies of golfers and how 'Trowbridge' after seeing the Hovey pictures was 'keen to print them' and, in turn, how the same pictures set Behr 'all agog'. Equally confusing, a photo of Gil Nichols that had appeared in Camp's original 1916 *Vanity Fair* article is reproduced in Gilbreth's *Winged Foot* article, but identified as Francis Ouimet.

As we have documented, the series of events leading to the publication of the Gilbreth motion studies was a bit more circuitous, but no one ever accused Gilbreth – his own protests aside – of not

believing in self-promotion (Price 1989, 1992). Much the same, however, could be said of Camp. Whatever the reality, though, together the 'Father of Motion Study' and the 'Dean of American Sports' combined their talents to influence the world of golf in a manner that is yet evident today.

Acknowledgements

The helpful vetting of Achilles A. Armenakis, W. Jack Duncan and Daniel A. Wren, and the kind assistance of Mary A. Segó and Elizabeth M. Wilkinson, Karnes Archives & Special Collections, Purdue University Libraries; Doris A. Oliver, Special Collections, Samuel C. Williams Library, Stevens Institute of Technology; Cynthia Ostroff, Manuscripts and Archives, Yale University Library; and Megan M. Lounsbury, Interlibrary Borrowing, Troy H. Middleton Library, Louisiana State University, are gratefully acknowledged.

Notes

1. All correspondence between the Gilbreths and Camp and Frank Gilbreth and Otis Wood cited herein is preserved in the Karnes Archives & Special Collections, Frank and Lillian Gilbreth Collection, N File 51/0293/NAPTMD, Purdue University Libraries, West Lafayette, IN. Much of this correspondence is also available in the Walter Chauncey Camp Papers, Box 11, Folder 211, Manuscript and Archives, Sterling Memorial Library, Yale University, New Haven CT. All correspondence between Frank Gilbreth and Fred Taylor cited herein is preserved in File 59A, Frederick Winslow Taylor Collection, Special Collections, Samuel C. Williams Library, Stevens Institute of Technology.
2. Correspondence from Gilbreth to Taylor dated 21 May 1913 and 6 June 1913, and from Taylor to Gilbreth dated 30 May 1913, confirms this statement and indicates that Gilbreth provided Taylor with photographs 'timing a baseball play, and also running a race' to forward to Camp.
3. Why Camp and Brooks chose the variant 'put' over the more common 'putt' remains a mystery.
4. In turn, it should be noted that Scripture was aware of Marey's (1894) earlier work, *Le Mouvement*, citing it in his 1897 book *The New Psychology* (Scripture 1897: 112).
5. Gilbreth and Gilbreth (1924: 153) reported that Frank had begun using photography in motion study in 1892.
6. Gilbreth was a member of the Simplified Spelling Board's Advisory Council. His alternative spelling of 'thoroughly' complies with the Board's recommendations for spelling reform. For further details, see Gilbreth (1923).

References

- Amar, J. 1914/1920. *The Human Motor, or, The Scientific Foundations of Labour and Industry*, translated by E. P. Butterworth and G. E. Wright. London: G. Routledge.
- Anonymous. 1905. 'Long Drives.' *Golfers' Magazine*, May, p. 86.
- Anonymous. 1913. "'Movies" to Help Baseball Players Economize Force.' *New York Tribune*, 15 June, Sports section, p. 3.
- Anonymous. 1914. 'Golf Shown by "Movies:" British Championship Played on Canvas in Knickerbocker Theatre.' *New York Times*, 15 July, p. 7.
- Anonymous. 1917a. 'Charting the Golf Swing.' *Golf* 40(3): 164.
- Anonymous. 1917b. 'Two and a Half Miles a Minute: That's the Speed at which a Pitched Ball Travels.' *Popular Science Monthly* 91(2): 227.
- Bannard, W. 1920. 'Charting a Champion.' *Popular Science Monthly* 96(1): 44–5.
- Bedeian, A. G. 1976. 'Finding "The One Best Way" – An Appreciation of Frank B. Gilbreth, the Father of Motion Study.' *Conference Board Record* 16(6): 37–9.
- Braun, M. 1995. *Picturing Time: The Work of Etienne-Jules Marey (1830–1904)*. Chicago, IL: University of Chicago Press.
- Brown, E. H. 2005. *The Corporate Eye: Photography and the Rationalization of American Commercial Culture, 1884–1919*. Baltimore, MD: Johns Hopkins University Press.

- Camp, W. C. 1910a. 'Golf the Game of Courtesy.' *Century Illustrated Monthly Magazine* 80(6): 820–32.
- Camp, W. C. 1910b. 'The New Idea in Athletics.' *Outing Magazine* 55(6): 651–61.
- Camp, W. C. 1916. 'A Photographic Analysis of Golf: And the Lessons Learned from a Series of Novel Cyclograph Pictures.' *Vanity Fair* 6(4): 62–4.
- Camp, W. C. 1917a. 'Moving Pictures for Golfers: With Notes and Comments on a Famous Professional and a Famous Amateur.' *Vanity Fair* 7(5): 72.
- Camp, W. C. 1917b. 'Charting the Golf Swing.' *Golf Illustrated* 6(5): 23–6.
- Camp, W. C. 1925. *The Daily Dozen*. New York: Reynolds Publishing.
- Camp, W. C., and L. Brooks. 1899. *Drives and Puts: A Book of Golf Stories*. Boston, MA: L. C. Page.
- Frost, M. 2002. *The Greatest Game Ever Played: Harry Vardon, Francis Ouimet, and the Birth of Modern Golf*. New York: Hyperion.
- Gilbreth, F. B. 1917. 'Motion Pictures of James M. Barnes, the Professional Champion of America, Making a Drive.' *Golf Illustrated* 7(1): 22–3.
- Gilbreth, F. B. 1918. 'Motion Study of Golf Champions, including Francis Ouimet and Gil Nichols.' *The Winged Foot: A Monthly Magazine Devoted to the Interests of the New York Athletic Club* 29(3): 15.
- Gilbreth, F. B. 1923. 'The Standardization of Spelling.' *Society of Industrial Engineers Bulletin* 5(9): 3–9.
- Gilbreth, F. B., and L. M. Gilbreth. 1915. *Motion Models: Their Use in the Transference of Experience and the Presentation of Comparative Results in Educational Methods*. Providence, RI: Frank B. Gilbreth, Inc. [Reprinted in Gilbreth, F. B. and Gilbreth, L. M. 1917. *Applied Motion Study: A Collection of Papers on the Efficient Method of Industrial Preparedness* (pp. 97–130). New York: Macmillan.]
- Gilbreth, F. B., and L. M. Gilbreth. 1916a. 'Motion Study and Time Study Instruments of Precision.' *Transactions of the International Engineering Congress, 1915 Vol. 11* (pp. 473–88). San Francisco, CA: Neal Publishing.
- Gilbreth, F. B., and L. M. Gilbreth. 1916b. *Fatigue Study: The Elimination of Humanity's Greatest Unnecessary Waste*. New York: Sturgis & Walton.
- Gilbreth, F. B., and L. M. Gilbreth. 1924. 'Classifying the Elements of Work: Methods of Analyzing Work into Seventeen Subdivisions.' *Management and Administration* 8(2): 151–4.
- Glass, J. 1934. 'When Famous Men Play Golf: Mr. John Hays Hammond Recalls his Early Golfing Experiences.' *American Golfer* 37(9): 25, 50, 52, 54, 56.
- Goodwin, C. J. 2009. 'E. W. Scripture: The Application of "New Psychology" Methodology to Athletics.' In *Psychology Gets in the Game: Sport, Mind, and Behavior, 1880–1960*, edited by C. D. Green and L. T. Benjamin, Jr. (pp. 78–97). Lincoln, NB: University of Nebraska Press.
- Grimsley, W. 1966. *Golf: Its History, People and Events*. Englewood Cliffs, NJ: Prentice-Hall.
- Hepburn, W. M. 1947. *A Manual of the William Freeman Myrick Goss Library of the History of Engineering and Associated Collections*. Lafayette, IN: Purdue University, Engineering Experiment Station.
- Ioteyko, J. 1919. *The Science of Labour and its Organization*. London: G. Routledge.
- Kelly, F. C. 1920. 'The Man of the "One Best Way": How Frank Gilbreth Studies Men and their Ways.' *Popular Science Monthly* 97(6): 34–5.
- Kern, S. R. 1983. *The Culture of Time & Space: 1880–1918*. Cambridge, MA: Harvard University Press.
- Lahy, J.-M. 1916. *Le Système Taylor et la Physiologie du Travail Professionnel*. Paris: Masson & Cie.
- Lancaster, J. 2004. *Making Time: Lillian Moller Gilbreth: A Life Beyond 'Cheaper by the Dozen'*. Boston, MA: Northeastern University Press.
- Lindstrom, R. 2000. "'They All Believe They Are Undiscovered Mary Pickfords': Workers, Photography, and Scientific Management." *Technology and Culture* 41(4): 725–51.
- McKillop, M., and A. D. McKillop. 1917. *Efficiency Methods: An Introduction to Scientific Management*. London: G. Routledge.
- Mandel, M. 1989. *Making Good Time: Scientific Management, the Gilbreths Photography and Motion Futurism*. Santa Cruz, CA: M. Mandel.
- Marey, E.-J. 1894. *Le Mouvement*. Paris: G. Masson.
- Martin, J. S. 1961. 'Walter Camp and his Gridiron Game.' *American Heritage* 12(6): 50–5, 77–81.
- Phelps, W. L. 1930. 'Thirty Years of Looking Up.' *The Rotarian* 37(3): 12–14, 54–5.

- Price, B. C. 1989. 'Frank and Lillian Gilbreth and the Manufacture and Marketing of Motion Study, 1908–1924.' *Business and Economic History*, 2nd series 18: 88–98.
- Price, B. C. 1992. 'Frank and Lillian Gilbreth and the Motion Study Controversy.' In *A Mental Revolution: Scientific Management since Taylor*, edited by D. M. Nelson (pp. 58–76). Columbus, OH: Ohio State University Press.
- Scripture, E. W. 1894. 'Tests of Mental Ability as Exhibited in Fencing.' *Studies from the Yale Psychological Laboratory* 2: 122–3.
- Scripture, E. W. 1897. *The New Psychology*. London: Walter Scott.
- Talbot, F. A. A. 1913. *Practical Cinematography and its Applications*. London: William Heinemann.
- Taylor, S. G., and A. G. Bedeian. 2007. 'From Boardroom to Bunker: How Fred Taylor Changed the Game of Golf Forever.' *Management & Organizational History* 2(3): 195–218.
- Taylor, S. G., and A. G. Bedeian. 2008. 'The Fred Taylor Baseball Myth: A Son Goes to Bat for His Father.' *Journal of Management History* 14(3): 294–8.
- Townsend, R. T. 1916. 'The Magic of Motion Study.' *The World's Work* 32(3): 321–36.
- University of Pennsylvania. 1888. *Animal Locomotion: The Muybridge Work at the University of Pennsylvania*. Philadelphia, PA: J. B. Lippincott.
- Welch, L. S., and W. C. Camp. 1899. *Yale: Her Campus, Class-rooms, and Athletics*. Boston, MA: L. C. Page.
- Wren, D. M., and A. G. Bedeian. 2009. *The Evolution of Management Thought*, 6th Edn. New York: Wiley.
- Yost, E. 1949. *Frank and Lillian Gilbreth: Partners for Life*. New Brunswick, NJ: Rutgers University Press.

Author Biography

ARTHUR G. BEDEIAN is a Boyd Professor at Louisiana State University, where he has been a faculty member since 1985. In 1988–89, he served as the 44th President of the Academy of Management. He is a former Dean of the Academy's Fellows Group and a past recipient of the Academy's Distinguished Service Award, Ronald G. Greenwood Lifetime Achievement Award, and Richard M. Hodgetts Distinguished Career Award. He has also served as president of the Foundation for Administrative Research, the Allied Southern Business Association, the Southern Management Association, and the Southeastern Institute for Decision Sciences. A former editor of the *Journal of Management*, he is a Fellow of the American Psychological Association, the Southern Management Association, the International Academy of Management, the Society for Industrial & Organizational Psychology, and the American Psychological Society.