We sincerely thank the reviewers for the feedback they offered. Your comments have identified several opportunities for clarification and potential changes in our framing that we think will help strengthen the paper.

RISKS OF HISTORICAL ANALYSIS

1AC and R5 bring up that one of the potential hazards with historical analysis is that it tends to strip away context in pursuit of ahistoric conclusions. This is an excellent point, and the reference to Rosenberg's work in particular is especially beneficial to us, as his work (in 1982 and later 1994) offers a concise description of the spirit of the method we adopted here, and articulates a use case for this approach.

In our revision, we will to clarify:

1. that our contribution offers to fill some of the gaps in crowd work and suggests potential futures (perhaps specifically offering "to narrow our estimates and thus to concentrate resources in directions that are more likely to have useful payoffs" [3]); and
2. that our method of connecting history to modern socio-technical phenomena may be a powerful tool for researchers attempting to make sense of (seemingly) new phenomena (for example, arguing "that past history is an indispensable source of information to anyone interested in characterizing technologies" [4]).

CASE STUDY FOCUS

R5 also points out that we give attention to Grier's work and the case study of human computers, perhaps at the expense of the other case studies. Our goal had been to equally highlight the cases of the "match–girls" and railroad workers. While we occasionally bring to light other cases (such as the industrial workers during the Second World War), we'll attempt to bring the two major case studies to a similar level of attention as we afford Airy's human computers, making these three case studies into more equal threads which recur throughout the paper.

We can elaborate on a number of aspects of match–girls' work and how it relates to crowd work under the case studies of decomposition and worker relations in the following ways:

Decomposition

We can delve into the parallels between Airy's computers, match–girls, farm work, and railroad work in the context of the decomposition of work by looking at the compensation models which directed attention toward discrete, measurable output (namely, rather than remuneration by time). We can further flesh this topic out by highlighting the overarching driving force to discretize work output and render payment for each individual unit of output, in some cases (e.g. match–girls' work manufacturing individual matches) more effectively than others (e.g. railroad workers renewing a coupler, or farm workers birthing a foal). Hypothesizing (and in the case of railroad work, deriving some insight from the critiques outlined by Labor. Railway Employees Dept and Board's grievances [2]) from these cases, we might infer that inadequate measurement approaches — particularly those which leave open the opportunity for systematized gaming — stymied piecework's popularity in some cases, while in others it flourished.

Relationships

With regard to the relationships among workers and between workers and their managers, we see ample opportunity to further develop the case studies of match–girls in both the context of their cooperation (that

is, how they collectively acted to initiate a workers' strike), and in the context of their relationships with managers (that is, a decidedly adversarial one, fraught with arbitrary and sometimes punitive payment deductions). Regarding railroad workers (and to a lesser extent farm workers), our sources gave some insight to the relationships between workers and their managers, but "anthropological" studies of the sociality of workers and their relationships with managers and each other was, as we conclude later, notably sparse relative to what we now know about crowd work and its culture.

TOPIC SELECTION

R3 and R4 noted our decision to cluster crowd work research around three questions that consolidated some research — for instance, the "quantity-quality dilemma" (R4), "professional development" (R3) and "incentive structures" (R3) — into other broader topics. This critique is well taken. We will dedicate some space to reflect on the decisions we made with regard to clustering research topics.

RELATED WORK

R4 and R5 offer a number of works (e.g. Williamson) for a more comprehensive discussion of scientific management. We agree that these works will substantively add to a reader's understanding of scientific management. We'll attempt to crystallize the body of work concisely, and point out that there's much more to be said about these topics.

ETHICS

R4 asks whether our analysis can shed any light onto the question of "whether it is ethical, to make use of crowd work in HCI research". We had two interpretations of this question: 1) whether piecework itself is ethical, or 2) whether research on crowdwork is ethical. We'll engage here with the former.

We will add this topic to the Discussion of our paper, integrating R4's suggested Williamson paper. Briefly, the literature on the history of labor does not position itself as stating that piecework is inherently ethical or unethical; the question, rather, is what conditions render it exploitative?

This literature argues that the exploitation occurs when conditions put workers in harm's way, such as in sweatshops and agricultural work with pesticides, or where employers systematically underpay or overwork laborers by contemporary standards.

The question then becomes whether the socio–technical infrastructure of Mechanical Turk and other marketplaces are putting workers in harm's way, underpaying, or overworking. Mechanical Turk itself does not directly require any amount of payment or work. However, its design does encourage employers to engage in such behaviors: piecework rates, for example, undervalue workers' task search time, and the task design interfaces explicitly encourage replication across multiple workers of uncertain quality rather than identifying one worker and paying them more.

References

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[3] Nathan Rosenberg. *Exploring the black box: Technology, economics, and history*. Cambridge University Press, 1994.

[4] Nathan Rosenberg. *Inside the black box: technology and economics*. Cambridge University Press, 1982.

[5] Vanessa Williamson. "On the Ethics of Crowdsourced Research". In: *PS: Political Science & Politics* 49.1 (Jan. 2016), pp. 77–81. DOI: 10.1017/S104909651500116X. URL: https://www.cambridge.org/core/article/on-the-ethics-of-crowdsourced-research/B1BDFB1111B416DD0B71540CD6E7D94F.