



Social Media in Emergency Management: A Quick Look



30 November 2012

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Prepared for the
Department of Homeland Security
Science and Technology Directorate

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The purpose of the task is to support lessons-learned efforts within DHS and across the homeland security enterprise.

The results presented in this report do not necessarily reflect official DHS opinion or policy.



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CENTER FOR RESPONSE AND SECURITY LESSONS LEARNED

The Homeland Security Studies and Analysis Institute's (HSSAI) Center for Response and Security Lessons Learned (CRSLL) was established in 2011 to help "observed lessons" from significant critical incidents become "lessons learned" through changes in policy or operations across the homeland security enterprise. As part of that mission, CRSLL helps identify emerging issues or trends that may impact responders; this paper was developed by CRSLL staff to highlight the impact that social media are having during disasters.

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EXECUTIVE SUMMARY

Social media have emerged as a powerful means for emergency managers to communicate with the public before, during, and after an emergency. A preliminary examination of this phenomenon suggests that emergency managers use social media for three general purposes: (1) as a channel for public service announcements, (2) as a source of information, and (3) as means to “crowdsource” certain capabilities.¹

Social media have been successfully employed for all three purposes in a number of emergency management situations, yet several questions remain. These include how to respond to calls for help over social networks, how to resolve privacy concerns, and whether information reported by the public is reliable enough to inform response operations.

This preliminary review yields several conclusions, which point to areas where additional research may help emergency managers better employ social media:

- Social media training can enhance response capabilities. Additional research could examine best practices to include in training.
- Social media strategies should be optimized for mobile devices. Additional research could identify techniques that are best suited to a mobile audience.
- Emergency managers should anticipate requests for assistance over social networks. Additional research could analyze different approaches to handling such requests.
- Communications strategies need to integrate multiple modes of communication. Additional research could explore strategies that include a mix of communication technologies or that target specific populations.
- Social media will be used differently at each level of government. Additional research could examine strategies at the local, state, and federal levels.
- Emergency managers should anticipate response efforts by private citizens. Additional research could explore techniques to engage self-organizing response efforts that exist outside any official chain of command.

¹ Crowdsourcing is “the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional employees or suppliers.” Merriam-Webster online, s.v. “crowdsourcing,” accessed November 15, 2012, <http://www.merriam-webster.com/dictionary/crowdsourcing>.

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INTRODUCTION

One of the fundamental challenges of emergency management is communicating effectively with the public before, during, and after an emergency. In recent years, social media have emerged as potentially powerful means of communication. One of the appeals of social media is that they not only allow emergency managers to broadcast messages to the public, but they also allow engagement with the public that can keep managers better informed and leverage the public as an asset in emergency response.

This paper provides a preliminary examination of current efforts to leverage social media in emergency management and the issues that may arise from increased reliance upon social media.

Definitions

Before examining how “social media” can assist “emergency managers,” it is necessary to define these terms. Most definitions of social media are very broad. Some consider social media to encompass all “Internet-based applications that enable people to communicate and share resources and information.”² Others suggest “the defining feature of social media is that content is created, at least in part, by users.”³ For the purposes of this paper, the quintessential characteristic of social media is that they allow the free exchange of information among a community of users. The most prominent examples are Twitter and Facebook. Other examples include blogs, YouTube, Flickr, and similar sites to the extent that they facilitate multilateral exchanges of information.

Although much of this paper is focused on the Department of Homeland Security and the Federal Emergency Management Agency (FEMA), the term “emergency managers” applies more broadly. It encompasses managers at all levels of federal, state, and local government with a need to communicate with the public in an emergency.

Scope

This paper considers three primary functions of social media in emergency management:

1. As a channel for public service announcements
2. As a source of information for emergency responders
3. As a feedback loop that uses the first two functions to develop “crowdsourced” capabilities

It is important to recognize that many modes of communication other than social media will be useful in emergency management. Traditional methods such as radio and

² Bruce R. Lindsay, *Social Media and Disasters: Current Uses, Future Options, and Policy Considerations*, R41987 (Washington: Congressional Research Service, September 6, 2011), 1.

³ *Key Concepts in Public Relations*, (London: Sage Publications, 2009) s.v. “Social Media,” accessed November 14, 2012, http://www.credoreference.com/entry/sageukpr/social_media.

television broadcasts remain valuable assets. Newer modes of communication, such as geographically targeted text messages, also hold much promise.⁴ By focusing on social media, this paper is not intended to detract from these other communication methods. To the contrary, where possible this paper identifies ways in which social media can work in concert with these already powerful tools.

Methodology

The research for this paper sought to identify how emergency managers currently use social media and any issues that may arise from such use. The research consisted of a limited literature review to capture a snapshot of the current state and likely direction of social media as a tool for emergency management. Despite being relatively new, this field of study has quickly become the subject of vigorous academic and professional discourse. The research for this paper focused on a small cross-section of that literature to identify major themes. Not surprisingly, many of the thought leaders in this field publish on blogs and share their ideas through other online channels. For instance, the Twitter hashtag #smem has been praised by FEMA Administrator Craig Fugate for facilitating conversations among the “social media in emergency management” community.⁵ Where feasible, the literature review included insights from those forums as well.

⁴ “Commercial Mobile Alert System (CMAS),” Federal Communications Commission, accessed November 15, 2012, <http://www.fcc.gov/guides/commercial-mobile-alert-system-cmas>.

⁵ A “hashtag” is a method of categorizing tweets by marking them with keywords. Fugate’s remarks come from *Understanding the Power of Social Media as a Communication Tool in the Aftermath of Disasters, Before the S. Comm. on Homeland Security and Government Affairs Subcomm. on Disaster Recovery and Intergovernmental Affairs*, 112th Cong. (May 4, 2011) (written statement of Craig Fugate, Administrator, Federal Emergency Management Agency) <http://www.dhs.gov/news/2011/05/04/written-statement-craig-fugate-administrator-federal-emergency-management-agency>.

FINDINGS

As noted above, this paper examines three uses for social media in emergency response: as a platform for public service announcements, as an information source, and as a means to develop crowdsourced capabilities. For each of these applications, this section identifies how emergency managers might use social media and what concerns are associated with such use.

Social Media as a Public Address System

Social media provide several useful avenues for broadcasting announcements to the public before, during, and after an emergency event. This use of social media closely resembles traditional communications strategies and consists of one-way communication from the broadcaster to the public. Prior to an event, emergency management agencies use this approach to provide preparedness information and, when possible, warnings. During the response to and recovery from an event, responders can use social media to notify the public about unsafe areas, announce the locations of shelters and other resources, and provide general status updates. Social media also provide good platforms for responding to incorrect information. Following Hurricane Sandy in October 2012, rumors circulated on social networks about paid volunteer opportunities and reimbursements for survivors. FEMA used social media to debunk any misinformation.⁶ The advantage of communicating with social media, according to Administrator Fugate, is that it employs “the tools that people use on a daily basis.”⁷

There are two other advantages of using social media for post-disaster communications, both of which arise from the fact that many users access social media via smartphones.⁸ First, people often keep their phones with them, which means they are likely to have them on hand in an emergency. Second, cellular networks sometimes prove more resilient than other communications infrastructure.⁹ This suggests that social media may be able to reach sizable segments of the public that traditional communications efforts may not.

Of the three uses for social media discussed in this paper, use as a public address system is by far the most widely employed by emergency managers. FEMA itself operates more than

⁶ FEMA Region III, November 12, 2012 (2:05 p.m.), twitter post via @FEMAREGION3, <https://twitter.com/femaregion3/status/268112218699227136>.

⁷ Fugate, *Understanding the Power of Social Media*.

⁸ An April 2012 survey by the Pew Research Center found 40 percent of cellphone owners use their phones to access social media. Joanna Brenner, “Pew Internet: Social Networking (Full Detail),” Pew Internet and American Life Project, November 13, 2012, <http://www.pewinternet.org/Commentary/2012/March/Pew-Internet-Social-Networking-full-detail.aspx>.

⁹ This was the case following the 2010 earthquake in Haiti, and more recently in New York City following Hurricane Sandy. For example, see Craig Fugate, “Haiti: The Importance of Social Media Use During a Disaster,” remarks at the Esri 2011 Federal User Conference, January 19, 2011, <http://video.esri.com/watch/163/haiti-the-importance-of-social-media-use-during-a-disaster>; and Rakesh Bharania, “Observations on Hurricane Sandy and Disaster Networks,” *idisaster 2.0*, November 19, 2012, <http://idisaster.wordpress.com/2012/11/19/observations-on-hurricane-sandy-and-disaster-networks/>.

a dozen separate Twitter accounts, and many state and local agencies have followed suit.¹⁰ Perhaps one reason for the popularity of this use for social media is it requires the least divergence from standard emergency response practices—a social media element can easily be appended to existing public communications plans. Another benefit of this approach is that most social media software includes built-in metrics (such as numbers of “likes” on Facebook) that allow emergency managers to gauge the reach of their messages.¹¹

One possible risk of this approach is users may expect an emergency management agency to respond to questions or calls for help delivered over social networks. Directing the public to call 9-1-1 does not necessarily safeguard against an expectation that requests for assistance over social networks will be answered.¹² In fact, a public survey by the Red Cross in 2012 found that 76 percent of the public would expect help to arrive within three hours if they posted a request on a social media website.¹³ That figure is up from 68 percent the year before.¹⁴

Social Media as an Information Source

Monitoring social media during an emergency can allow responders to develop a clearer operating picture than they might otherwise have. Administrator Fugate noted that “the public is putting out better situational awareness than many of our own agencies can with our official datasets.”¹⁵ Merging information from the public with official information can help validate responders’ operating picture, or identify information gaps.¹⁶

One advantage of using social media to inform operations is that many types of social media contain metadata. That is, when a user publishes a tweet, photo, video, etc., it often contains additional information, such as the precise time and location where it was created. In some formats, users can create additional metadata by adding keywords or hashtags to the information they post.

One of the challenges of monitoring social media for situational awareness is managing the sheer volume of information and identifying what is useful. One recent study examined Twitter use in four disaster areas and found that only 8 to 24 percent of tweets originating from those areas contained information that was relevant to situational

¹⁰ Fugate, *Understanding the Power of Social Media*.

¹¹ “IS-42 Social Media in Emergency Management,” Federal Emergency Management Agency, July 18, 2012, <http://training.fema.gov/EMIWeb/IS/is42.asp>.

¹² Kim Stephens, “Five SMEM Observations and Recommendations from Hurricane Sandy,” *idisaster 2.0*, November 6, 2012, <http://idisaster.wordpress.com/2012/11/06/five-smem-observations-and-recommendations-from-hurricane-sandy/>.

¹³ “Social Media in Disasters and Emergencies,” American Red Cross, July 10, 2012, <http://a1881.g.akamai.net/7/1881/26640/v0001/redcross.download.akamai.com/26640/PollData/Social-Media-Disasters-Emergencies.pptx>.

¹⁴ *Ibid.*

¹⁵ Fugate, “Haiti.”

¹⁶ *Ibid.*

awareness.¹⁷ Several aggregation tools exist that can help overcome this challenge. These tools collect information from multiple social media sites and filter it based on different criteria. While not perfect, the tools are useful enough that FEMA has included them in its training course on social media in emergency management.¹⁸

Another issue with using social media to inform an operating picture is the reliability of the information. Fraudulent reports are not uncommon, and may divert resources from places where they are truly needed.¹⁹ Worse yet, terrorists or other violent groups could use misinformation via social media in an attempt to endanger first responders or the public.²⁰ Though these are certainly concerns, inaccurate information is more likely to arise through less nefarious means. For instance, users may not post information the moment they observe something; many may wait until they are in a safe place. If these users travel some distance before they post, the metadata associated with their posts may inaccurately report the location of the incident.²¹ Emergency managers monitoring social media may also be challenged to determine which reports are duplicates.²² Following the 2011 earthquake and tsunami in Japan, responders observed that Twitter users were retweeting calls for help after the individuals in duress had been rescued.²³

Privacy issues present another set of challenges. Government monitoring of social media sites, even for emergency management purposes, raises privacy concerns. As of 2011, the Department of Homeland Security had conducted two privacy impact assessments related to social media, but neither examined how personal information shared during an emergency would be collected, used, or retained.²⁴

Social Media and Crowdsourcing

The concept of using crowdsourcing to facilitate emergency response took a giant leap forward in the wake of the 2010 earthquake in Haiti. Though the temblor destroyed much of the country's physical infrastructure, cellular service remained intact. Within 48 hours, Digicel, Haiti's largest wireless company, had coordinated with the U.S. State Department and a pair of technology innovators to establish a short code that people could text to

¹⁷ Sarah E. Vieweg, "Situational Awareness in Mass Emergency: A Behavioral and Linguistic Analysis of Microblogged Communications" (doctoral thesis, the University of Colorado at Boulder, 2012) 170–171, <http://works.bepress.com/vieweg/15/>.

¹⁸ "IS-42 Social Media in Emergency Management," Federal Emergency Management Agency, July 18, 2012, <http://training.fema.gov/EMIWeb/IS/is42.asp>.

¹⁹ Lindsay, *Social Media and Disasters*, 9.

²⁰ Huiji Gao, Geoffrey Barbier, and Rebecca Goolsby, "Harnessing the Crowdsourcing Power of Social Media for Disaster Relief," *Intelligent Systems, IEEE* 26, issue 3 (May/June 2011), 12.

²¹ Ibid.

²² Ibid.

²³ Lindsay, *Social Media and Disasters*, 6.

²⁴ Ibid., 8.

request emergency assistance.²⁵ Radio stations began advertising the code 4636 (which spells “info” on a phone keypad) and the texts began streaming in.²⁶ This on its own was a laudable achievement, but there was a problem. The texts were in Haitian Creole, a language almost none of the international aid workers streaming into the country spoke.

The volunteers who set up the 4636 code had anticipated this issue. They created a web-based forum that collected the help requests. Bilingual volunteers around the globe, many of them Haitian diaspora, went to the forum, translated the messages, categorized and geo-located them, and put them into a mapping system that responders could use to track requests and locate survivors.²⁷ The system received more than 80,000 requests for assistance; the median time between when a message was received and when it was sent to responders was five minutes.²⁸

The experience in Haiti changed mainstream thinking about the role of the public in an emergency.²⁹ It did this in two important ways. First, it showed that the public can change how it shares emergency information if prompted to do so. Second, it showed that the public can quickly and effectively become a part of the response corps.

FEMA has since embraced crowdsourcing as a way to enhance emergency response and recovery activities. Administrator Fugate explains that the agency’s “Whole Community” approach to emergency management recognizes “individuals, families and communities are our greatest assets. . . . The notion of treating the public as a resource rather than a liability is at the heart of our emergency management framework.”³⁰ FEMA’s social media training course suggests several different uses for crowdsourcing in emergency response, including identifying particularly relevant information and verifying its authenticity; tagging information with keywords and plotting it on interactive maps; and developing or adapting software to better serve responders’ needs during a particular event.³¹

Several crowdsourcing efforts emerged in the response to Hurricane Sandy. At the federal level, FEMA partnered with the Civil Air Patrol and the National Geospatial-Intelligence Agency to enlist the public’s help reviewing aerial imagery of the affected area.³² Users

²⁵ Christopher Connell, “In Haiti’s Hour of Need, Texting ‘4636’ Became a Lifeline,” *America.gov*, February 19, 2010. Accessed November 19, 2010, <http://www.america.gov/st/develop-english/2010/February/20100219131612berehelleK5.066395e-06.html>.

²⁶ Lukas Biewald, “How crowdsourcing helped Haiti’s relief efforts,” *O’Reilly Radar*, March 11, 2010, <http://radar.oreilly.com/2010/03/how-crowdsourcing-helped-haiti.html>.

²⁷ Robert Munro, “Crowdsourcing and the crisis-affected community: Lessons learned and looking forward from Mission 4636,” *Information Retrieval*, July 3, 2012, doi: 0.1007/s10791-012-9203-2.

²⁸ *Ibid.*

²⁹ Fugate, “Haiti.”

³⁰ Fugate, *Understanding the Power of Social Media*.

³¹ “IS-42 Social Media in Emergency Management,” Federal Emergency Management Agency, July 18, 2012, <http://training.fema.gov/EMIWeb/IS/is42.asp>.

³² “MapMill: Help the Civil Air Patrol Sort Images,” The Public Laboratory for Open Technology and Science, accessed November 16, 2012, <http://sandy.hotosm.org/>.

reviewed thousands of high-resolution images and identified areas with damaged buildings, flooding, or debris.³³ At the local level, volunteers in Crisfield, MD, used a social platform called SeeClickFix to help identify homes where people required assistance in support of FEMA's preliminary damage assessment.³⁴ Similarly, the county government in Fairfax, VA, launched an interactive map that allowed residents to report non-emergency incidents, such as flooded roads or downed power lines.³⁵ In New York City, additional crowdsourcing response efforts were organized by nongovernmental organizations and private citizens.³⁶

The issues associated with crowdsourcing largely echo the concerns with the uses of social media described above. There is an increased risk that users will request information through channels that cannot adequately respond to those requests. There are privacy concerns about how governments will collect, use, and store the information that is reported. There are also concerns about the veracity of information derived from crowdsourcing, though proponents argue crowdsourcing does a good job of identifying and correcting inaccurate reports.³⁷

One slightly novel concern related to crowdsourcing is the potential for emergency responders to rely too heavily on crowdsourced capabilities. Crowdsourcing can augment or replace a number of emergency response functions, but it is not always obvious which of those functions may be entrusted to "the crowd." For example, it is probably acceptable to ask for public assistance verifying and tagging user-submitted photographs of a disaster area. It might be less acceptable to completely replace an emergency dispatch function with a crowdsourced solution. Drawing a clear dividing line on the continuum between those activities is no easy task.

³³ Patrick Meier, "Crowdsourcing the Evaluation of Post-Sandy Building Damage Using Aerial Imagery," *iRevolution*, updated November 2, 2012, <http://irevolution.net/2012/11/01/crowdsourcing-sandy-building-damage/>.

³⁴ Ben Berkowitz, "Volunteers, Local Governments and FEMA use the Internet to fight back the effects of Sandy," SeeClickFix, November 2, 2012, <http://seeclickfix.blogspot.com/2012/11/volunteers-local-governments-and-fema.html>.

³⁵ "Fairfax County Reporting Map (beta)," Fairfax County Government, accessed November 19, 2012, <https://fairfaxcountysandy.crowdmap.com/main>.

³⁶ Caitlin Dewey, "Hurricane Sandy's social media clean-up efforts help New York, New Jersey recovery," *Washington Post*, November 20, 2012, http://www.washingtonpost.com/national/hurricane-sandys-social-media-clean-up-efforts-help-new-york-new-jersey-recovery/2012/11/20/32dddaf0-3029-11e2-ac4a-33b8b41fb531_story.html.

³⁷ Fugate, "Haiti."

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CONCLUSIONS AND THOUGHTS FOR FUTURE RESEARCH

In all likelihood, each of the three applications of social media in emergency management discussed above will continue to evolve as technologies and users become more sophisticated. As they develop, emergency managers may need to explore the following issues in greater detail.

- **Social media training can enhance response capabilities.** By its very nature, emergency response is unpredictable. Social media training can make emergency responders more capable of adapting a social media strategy to a specific emergency. This is true for each of the three applications discussed above. As a public address system, social media are typically deployed in a much faster information cycle than traditional communications strategies. This means less time to craft messages that are timely and accurate and that take the audience into account. Training can prepare emergency personnel to operate in such a fast-moving communications environment. As an information source, social media can present emergency personnel with an overwhelming stream of data. Training on aggregation and filtering tools and techniques will allow emergency managers to target the information they need and make better, more efficient use of it. Training on how to manage digital volunteers can enable emergency personnel to implement crowdsourcing efforts that serve the specific needs of a given response effort.

As emergency managers gain more experience with social media in emergency response, they will likely identify best practices. Future research could catalog these practices and incorporate them into ongoing training efforts.

- **Social media strategies should be optimized for mobile devices.** As mentioned above, many users access social media via smartphones. Evidence from the Pew Research Center suggests that this will increasingly be the case. In September 2012, Pew found that 45 percent of adults in the United States have smartphones, up from 35 percent in May 2011.³⁸ Moreover, in events where power or wired Internet access is interrupted, mobile devices may provide the only means to access social media.

This suggests that plans to use social media in emergency response should anticipate that the audience will be viewing the information on mobile devices. Future research and training could focus on best practices for a mobile-based audience. Examples might include posting information in mobile-friendly formats or providing charging stations during the recovery period.³⁹

- **Emergency managers should anticipate requests for assistance over social**

³⁸ Lee Rainie, "Smartphone Ownership Update: September 2012," Pew Internet and American Life Project, September 11, 2012, <http://pewinternet.org/Reports/2012/Smartphone-Update-Sept-2012/Findings.aspx>.

³⁹ Stephens, "Five SMEM Observations."

networks. Though emergency managers may instruct the public to call 9-1-1 in an emergency, it seems inevitable that requests for assistance will come over social networks as well. As mentioned above, the Red Cross found that more than three quarters of survey respondents expect a response to a help request via social media in under three hours. More than a third of respondents expected a response in less than an hour.⁴⁰

The public is even more likely to turn to social networks when 9-1-1 dispatchers are inundated with calls, as was the case in New York City during Hurricane Sandy. Stranded residents unable to reach 9-1-1 tweeted to the city's fire department.⁴¹ In this case, the manager of the @FDNY Twitter account notified dispatch directly, but this was not standard procedure.⁴² Emergency managers— particularly those at the local level—should consider developing plans for responding to emergency requests via unconventional channels. This should not be limited to requests via social media; text messages are another likely channel. Future research could examine different tactics for responding to such requests.

- **Communications strategies need to integrate multiple modes of communication.** Emergency managers have many communications tools at their disposal, their options extend well beyond social media. For example, social media played only a partial role in the Haiti response. While the web-based forum for translating and mapping requests certainly fit the definition of social media, the requests themselves were sent by text message, and were prompted by radio announcements.

This suggests that the method of the communication is less important than the strategy behind it. In the wake of a major disaster, social networks may be completely offline in the affected area. While this would certainly preclude using social media to communicate with the affected public, social media might be an ideal tool for coordinating volunteer efforts outside the affected area. Further research might examine the merits of emergency communication strategies that blend technologies or target discrete populations.

- **Social media will be used differently at each level of government.** State and local organizations have different roles and responsibilities than federal organizations in an emergency response. It seems likely that they will employ social media differently. Local organizations are better positioned to meet the specific needs of their communities, while regional or national organizations may be better positioned to enlist large numbers of volunteers. Following Hurricane Sandy, one observer noted the importance of “hyper-local information” in an

⁴⁰ Red Cross, “Social Media in Disasters.”

⁴¹ Yasmin Khorram, “As Sandy pounded NYC, fire department worker was a Twitter lifeline,” CNN, November 1, 2012, http://www.cnn.com/2012/11/01/tech/social-media/twitter-fdny/?hpt=us_c1; and Stephens, “Five SMEM Observations.”

⁴² Ibid.

emergency.⁴³ That is, information about street closures or other hazards as well as the location of supplies or other assistance is extremely helpful at the local level, but not at higher levels. Future research might examine best practices for social media use at different levels of government.

- **Emergency managers should anticipate response efforts by private citizens.**

As noted above, some responses to emergencies will occur outside any official government chain of command. Organizations or individuals will almost inevitably use social media to share information and coordinate response activities, regardless of government involvement. This is unsurprising, given that social media users trust emergency information from their friends and family more than from any other source.⁴⁴

There are many benefits to this kind of local innovation, and FEMA's "Whole Community" encourages and seeks to empower these kinds of response efforts. However, the organizations behind such operations may be inexperienced, and without guidance or coordination they may become a hindrance to other response efforts.⁴⁵ Future research might examine different approaches for engaging independent response efforts to maximize their contributions while minimizing their potential to impede government efforts.

Overall, social media offer emergency managers a unique set of tools for engaging the public before, during, and after an emergency. Though these technologies and the operational knowledge of how to use them continue to evolve, preliminary applications have been quite successful. Continued study will likely produce new tools and techniques that ensure ongoing success.

⁴³ Stephens, "Five SMEM Observations."

⁴⁴ Red Cross, "Social Media in Disasters."

⁴⁵ Bharania, "Observations on Hurricane Sandy."

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